

JUNE 1995

# HP Professional

**INSIDE:**  
**Client-Server  
Supplement**

**SPECIAL ISSUE:**

## **MULTIPLATFORM STORAGE MANAGEMENT**

**How Do Your  
Options Stack Up?**

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**HP's AutoRAID**

**IBM's ADSM**

**HP 9000 vs.  
AS/400 Storage**

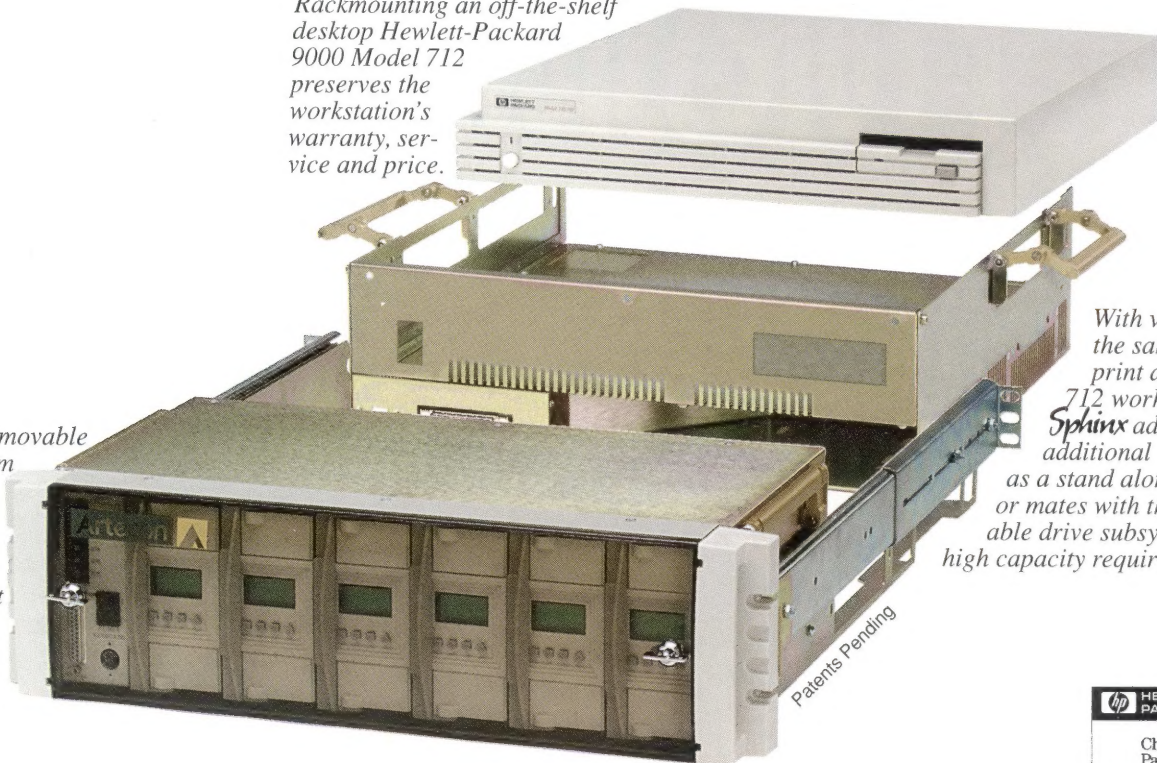
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And HSM**



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*With virtually the same footprint as the HP 712 workstation, Sphinx adds two additional devices as a stand alone chassis or mates with the removable drive subsystem for high capacity requirements.*

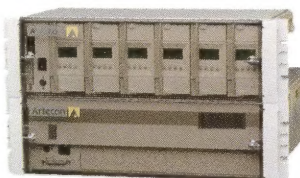


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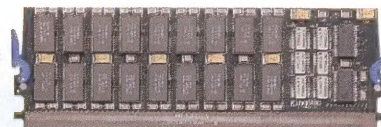
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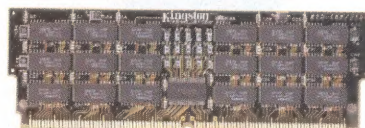
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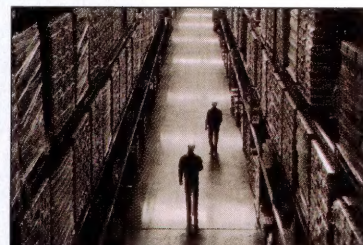
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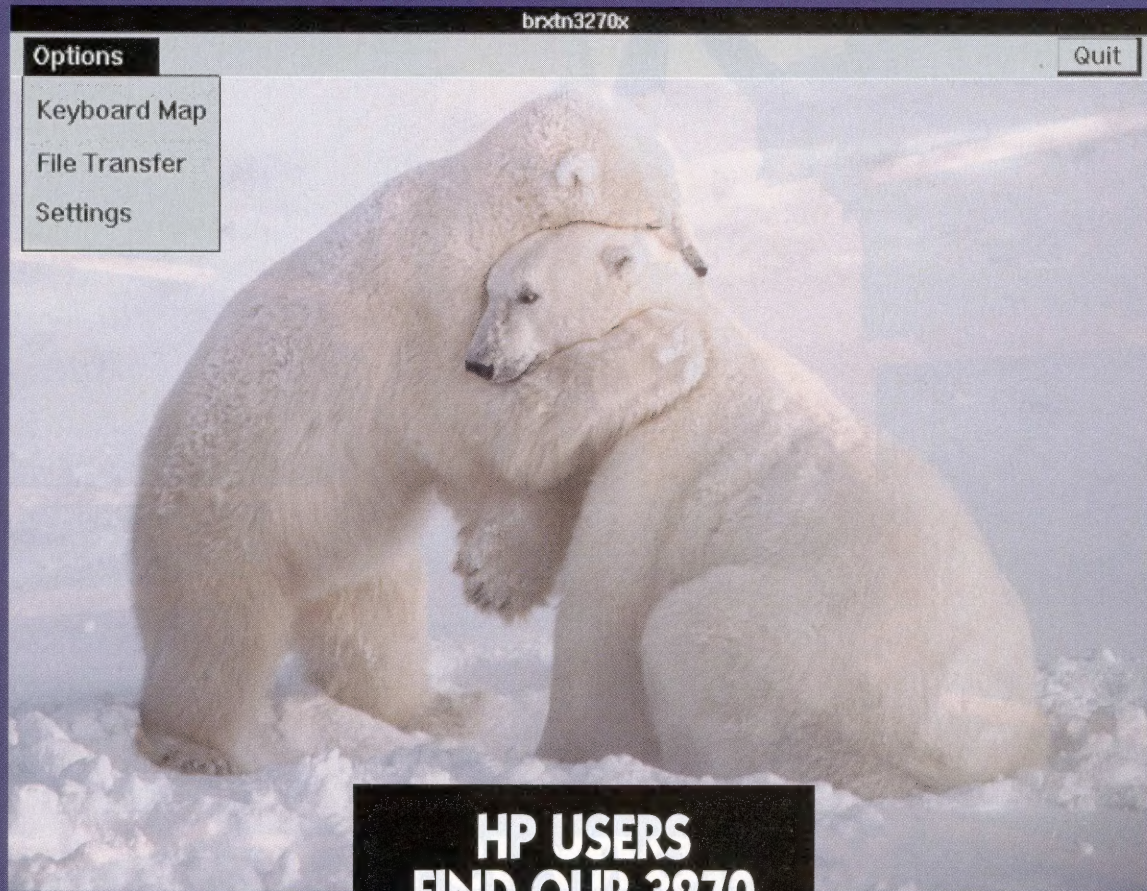
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# A Declaration Of Independence

*HP Professional* recently conducted an independent audit of our readers. For the most part, we were quite pleased to see that you agree we are on track with our coverage, our choice of topics and our timeliness. However, I was surprised to learn that 28 percent of our surveyed readers *didn't realize* that *HP Professional* is an independently published magazine. Even more surprising, while completing a turn in the Midwest visiting vendors, I also discovered that a few third-party vendors did not realize that *HP Professional* was an independent publication.

By independent I mean, we are not owned or anyway affiliated with Hewlett-Packard or any other organization. We do, however, work closely with HP on some editorial projects. And several key HP management executives have kindly consented to be on our Editorial Advisory Board. In fact, this month we formally welcome Frank Humphries to the HP Professional Editorial Advisory Board. Frank is the director of marketing at Hewlett-Packard Asia Pacific Ltd.

Frank will provide the insight and direction needed for our *HP Professional Asia Pacific* edition which premiered last month. In addition, Frank will help us focus the global view of all three *HP Professional* publications, including the European and the North American editions. In other words, Frank has joined the Board's mission to help us help you.

And just who are you? Well, according to what you told us: 38 percent are in management, 16 percent are in technical support, and engineer, administrator and programmer each comprised 10 percent. But now that you told us about yourselves, let me tell you a little about *HP Professional*?

*HP Professional* is published by Cardinal Business Media Inc. (CBM), which is headquartered in Fort Washington, Pennsylvania. CBM consists of four divisions — High Tech, Sports and Fitness, Health Care and Consumer Goods. High Tech, the largest division, is divided between Fort Washington and Dallas, Texas. *HP Professional's* sister publications include *DEC Professional*, *Midrange Systems*, *Internetwork* and *Imaging World*. In addition, CBM also owns and produces several trade shows including TCP/IP Expo, which is produced and sponsored by *Internetwork*. TCP/IP Expo premieres August 6, 1995 in San Jose, California.

All articles that appear in *HP Professional* are written by independent authors who are professional journalists, MIS directors, presidents of high-tech companies, consultants, programmers or technicians like yourself. When appropriate, we accept contributed articles from HP or third-party players who we believe are experts in their field. These articles are then edited, revised or even rewritten by *HP Professional's* experienced staff editors including Technical Editor George Thompson, Assistant Editor Deborah Schwartz and yours truly.

For example, this month's special issue, dedicated to multiplatform storage management, includes articles from several leading industry experts including HP, IBM and Spectra Logic. The articles cover their views and opinions, as well as tips and comparisons on multiplatform storage. In addition, you'll find George Thompson's in-depth piece on optical storage and HSM, and valuable information on specific storage products.

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**By Charlie  
Simpson**

*Charlie Simpson*

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## Coming Clean With Amway

The March issue includes a column by Gordon McLachlan titled "The Big Sell." In the column, McLachlan argues the case for HP to adopt a direct sales strategy similar to Amway. In doing so, however, he may have created some confusion among readers about the Amway business opportunity.

Amway is one of the world's largest direct selling companies, with sales of \$5.3 billion at estimated retail for the fiscal year ended August 31, 1994 — an 18 percent increase from the previous year. More than 2 million independent Amway distributors in more than 65 countries and territories market home care, personal care, health and fitness, home tech and commercial products manufactured by Amway, plus 6,500 brand-name items through the PERSONAL SHOPPERS Catalog and other specialty catalogs.

Amway distributors earn money through the mark-up on sales of items they've bought wholesale, and through bonuses awarded on the total sales volume for themselves and those they recruit. Amway distributors do not earn bonuses for the act of recruiting, as indicated in the column.

Also, while many independent distributors buy motivational tapes and literature to assist them with their businesses, they are not required to do so, and are protected through a liberal refund policy.

*Kimberly A. Bruyn*  
Senior Manager of Public Relations  
Amway Corp.

*To catch up on this continuing soap opera, check out & Another Thing... on the back page.*

### DON'T GET SPOOKED

[As John P. Burke stated in his April 1995 column,] I agree NMSpooler is underdocumented (and underappreciated). I never learned **SPOOK**, so there were no habits to break. I have my own command files:

LSP — shows what spool files one (or rather, ones' logon) owns.

TSP — "types" a spool file (via the **:PRINT** command) to screen.

DSP — deletes spool files.

PSP — prints a spool file for hard copy.

I think, and firmly hope, that **SPIFF** is too late. I have left my command files in several client sites. As a migrating consultant, I have had to "port" my environment with me.

*Percy G. Wood*  
Consultant  
Precision Castparts Corp.

### MORE ON MIGRATION

Thank you for your dedication to educating your readers with relevant and timely information. In particular, I am referring to your coverage of UNIX integration with the HP 3000, and migration from the HP 3000 in the April issue.

As the article suggests, it may make sense to integrate their HP 3000 with UNIX systems. Or, a migration to a UNIX-based open system from the HP 3000 is a viable option. As I pointed out in "In A Perfect, Open World," migrations are fast, efficient and cost-effective. Many organizations see no need to run multiple systems when they can easily replace their HP 3000 with a UNIX system.

For those who wish to learn more about the migration solution, contact DB-NET Inc. at (614) 436-6565, (614) 847-0080 FAX; or via the internet at: VRONA@ix.netcom.com.

*Steven Verona*  
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I am requesting to use George A. Thompson's "A Diamond In The Rough" from the March 1994 issue as part of the required reading for our MS course, Management of Information Systems. Our course would greatly benefit from the inclusion of this work.

*Anna H. Pezzetti*

*Asst. to the Director of Education and  
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*P.S. In the April 1995 issue, BRS Software Products and their BRS/Search product were mentioned in the "Textbook Solutions" article. Dataware Technologies acquired BRS Software Products, in March 1994. Contact Dataware Technologies at (800) 229-8055 x122, or via the Internet at: [kwitaker@dataware.com](mailto:kwitaker@dataware.com).*

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# INDUSTRY WATCH

George A. Thompson

## RE-INVENTING HP

During last year's Interex keynote address in Denver, Lew Platt, HP's CEO and president, emphatically stated: "We have to be able to change even when things are going well." Well, he obviously meant it. Here's the proof: By anyone's standard, HP is having an excellent year in 1995. But in May, HP changed. While things were going well, HP announced the formation of the Computer Systems Group (CSG), a new organization within HP's Computer Systems Organization (CSO).

In the process, HP's Workstation Systems, and Systems and Server groups as well as the Systems Component group have ceased to exist. Instead, they will be consolidated with the HP 3000 division, the HP X terminal division, the mass storage division (formerly part of the Computer Products business unit) as well as the systems peripherals operations.

The CSG will be led by Bernard Guidon, formerly general manager of the Workstation Systems Group located in Chelmsford, Mass. According to John Logan, vice president of the Aberdeen Group (Boston, Mass.) Guidon has been "the sparkplug" in the CSO. "He now has responsibility for revving up the energy level of the entire HP 3000/9000 hardware line." For now, Guidon will remain in Chelmsford. A good move, according to Logan. "That will allow him to concentrate on strategic decisions rather than pure execution." ●

## SERIES 700 BY ANY OTHER NAME

So what changes can customers expect from a re-organized, re-energized HP? Don't look now. But this month HP introduced the HP 9000 J-class workstations. It's about time, you're think-



*HP's PA-7200-based J-class workstations are rated at up to 168 SPECint92 and 269 SPECfp92. Pricing starts at \$27,655 for the J200; \$35,655 for the J210.*

ing. HP hasn't brought any workstations to market for a year. But there's something wrong with this picture? If you said: "It's not a Series 700." You're right! If you also remember that HP just introduced an HP 9000 K-class server, go to the head of the, er, "class." It's the beginning of a trend at HP, reflecting a consolidation of the workstation and server product lines.

"There's a tremendous amount of overlap between those two systems, says George Gardner, HP's hardware product marketing manager. For example, the K-class servers and the new J-class J200 and J210 workstations both use HP's PA-7200 CPU and new 960 MBps bus architecture (affectionately referred to as the Runway Bus by HPers). On paper, the Runway Bus provides about three times the throughput of the HP 9000/735 workstation. "3.4 to be exact," says Gardner. Both the K-class and J-class systems also support Symmetric Multiprocessing (SMP). While the K-class servers can support up to four CPUs, the J-class systems can be configured with two CPUs. But says

Gardner, "HP-UX 10.0 is required for SMP."

The J-class and K-class also are upgradeable to PA-8000. "Of course, we're keeping multiple generations in mind." So, when can you expect PA-8000 CPUs in HP workstations? Just wait a year. Without committing himself, Gardner says, "if you study our product history, you'll see that we usually ship systems to the market in about 12 months." Not surprisingly,

the J-class systems were co-developed with the team that worked on the new K-class servers introduced this past April.

The J-class Models J200 and J210 are also the first HP workstations *not* using the Series 700 naming convention. "You'll see more and more of that as the next two years unfold. Over the long term, we want to synchronize [our nomenclature] and make sure we are in harmony with [the server division].

"It's a bit disappointing," says Gardner. "But it's time to move forward. We are still offering all the benefits that we've come to know and love over the years on Series 700 products," he says with just a hint of nostalgia in his voice. But what's in a name? According to Gardner, the J-class workstations are already part of the recently announced TAC-4 contract with the U.S. government. TAC-4 is centered around the J-class systems. "It's the largest deal [\$640 million] we've ever had around here." ●

## DON'T LET THE SUN GO DOWN ON YOU

That could be the theme song for HP's new Open Migration Program (OMP) for Sun, an aggressive campaign



by HP to convince over 1 million Sun Microsystems' customers to believe in the HP Way. According to Marc McKenzie, HP's worldwide open migration program manager, "Sun has not been taking care of its installed base." He cites Sun's transition from its original Motorola-based systems to the SPARC platform and the current transition from

SunOS to Solaris as stumbling blocks.

McKenzie notes that the SPARC platform is not keeping pace with industry-wide performance standards. Consequently, McKenzie concludes there has been a slow adoption of Solaris and ONC+ (a favored "son" at Sun) among the installed base. And Sun hasn't helped themselves in terms of service and support either. McKenzie

notes that Sun gets low scores in service and OS quality.

Here's the deal HP is offering Sun's installed base:

## ■ TradeUP '95

When trading in Sun or Sun-compatible workstations, servers or X terminals, Sun users will receive a 20 percent credit before any other purchase agreement discounts are applied.

## HIGH-TECH TRIVIA

We know there's a lot of computer news out there. And *HP Professional* is working hard to keep you up to date on the latest and greatest happenings. But this month, instead of the Research RoundUP which usually occupies this space, we

thought we would report on a happening of a lighter side of the computer. It's a look at what some the computer industry press and executive nerds do for fun (and charity).

For those who don't know, the Computer Bowl is the high-tech trivia contest that pits two teams of industry press and executives in a battle of bits. This year's contest was won by the West Coast team. The win broke a 3-3 tie, putting the West Coast ahead 4 to 3.

Held at the World Trade Center Boston (Boston, Mass.) and the Santa Clara, Calif. Convention Center, the Computer Bowl 1995 pit-

ted five players in a live, one-hour game of computer industry trivia hosted by Chris Morgan, author of the forthcoming *Computer Bowl Trivia Book*, and Nicholas Negroponte, director of the MIT's Media Lab. For cyberfreaks, the Bowl was conducted simultaneously on both coasts. And a customized digital buzzer system was designed to eliminate bi-coastal timing delays.

Also, for the first time, the Computer Bowl was played online. Some 400 America Online subscribers logged on to receive the questions as they were asked of the real players. The fun and games benefitted the Computer Museum located in Boston. A pre-game celebrity auction raised over \$50,000. Half that amount was paid for a rubylith of the Intel 8080 signed by its designers. Since 1988, \$1.7 million in donations and in-kind support for the Computer Museum has been raised.

If you didn't get in on it, below are the Top 10 questions from the 1995 Computer Bowl. Answers are on page 14.

**1.** Which computer company did Forrest Gump invest in?

day — both on American Airlines. Identify either flight number.

recently pledged a total of over \$4 million to the SETI Institute. What is this non-profit organization's purpose?

**2.** What name of an early personal computer is also the name of a cola drink?

**5.** How many parking spaces (according to the *New York Times*) are there in the garage at Bill Gates' new home?

**9.** Security expert Tsutomu Shimonura, a physicist at the San Diego Supercomputer Center, is better known for tracking down an alleged cyberthief. Who was he?

**3.** Last December, the MIT Museum filled a time capsule with some strange computer artifacts. Which was not included: an internet Barbie Doll, an autographed picture of Bill Gates or a copy of Microsoft Windows 3.1?

**6.** Did Raymond Tomlinson invent the @ sign for e-mail addresses, the hole in the middle of CD-ROMs or the blinking cursor?

**10.** According to Microsoft, Adam Bartz is the youngest beta tester for Windows 95. How old is he?

**4.** There are only two non-stop flights between Boston and San Jose each

**7.** What does FQDN stand for?

**8.** Four well-known computer personalities — David Packard, Gordon Moore, Paul Allen and Mitch Kapor —

**BONUS QUESTION for *HP Professional* readers:** David Packard and William Hewlett sold their first products (audio oscillators) to what famous movie studio? And for what movie?







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Computer Systems



## ■ Application portfolio and public-domain software

HP claims there are more than 10,000 native HP-UX applications. And with the help of the University of Liverpool in the UK, HP users can access up to 1,000 public-domain software applications on the World Wide Web (<http://hpux.csc.liv.ac.uk/>).

The Liverpool plans are ambitious. The network ports one to two software packages daily to HP-UX and has plans to update 500 additional applications annually. InterWorks (HP's workstation user group) provides a CD-ROM that contains executable code and is shipped with all HP systems.

There is also documentation (e.g., *SunOS to HP-UX Interoperability Cookbook*), software tools and assistance from HP and third-party partners like Bluestone Consulting, Integrated Computing Solutions, Melillo Consulting, National Information Systems, Qualix, UniPress and TriTeal. And HP's International Software Operation

Migration Center re-hosts applications from Sun and other non-HP platforms.

With a \$40 million contract in their corporate pocket, HP already counts Martin Marietta (Atlanta, Ga.) as a satisfied Sun defector. And Ohio State University (Columbus, Ohio) recently replaced 100 Sun workstations with HP 9000 Series 700 workstations through the TradeUP 95 program. HP also cites Windbond, Philips NV Medical Systems Division and L.M. Ericsson AB as those now using HP systems.

Still, maybe they should shout a little louder. According to the word on Wall Street, Sun Microsystems posted strong third quarter sales and earnings. And some analysts thought Sun's sales of enterprise systems was part of the reason. ●

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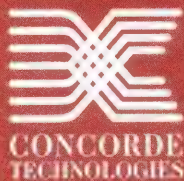
In April, HP introduced a VAR/software developer-oriented version of

their HP 200LX palmtop. In fact, the 100CX (\$449) is same as the user-oriented 200LX, but is designed for VARs and software developers in vertical markets who customize their solutions. VARs interested in more information should call (800) 443-1254. ●

## ANSWERS TO COMPUTER BOWL TRIVIA:

- Bonus Question:**  
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10. 9
  9. Kevin Mitnick
  8. Intelligence
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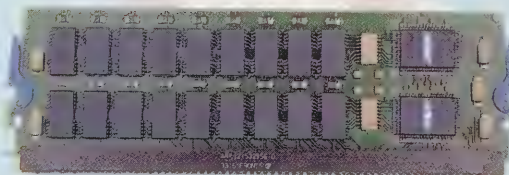
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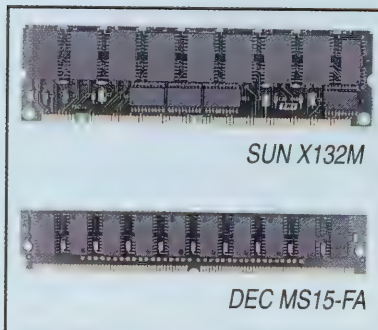
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HP 3000

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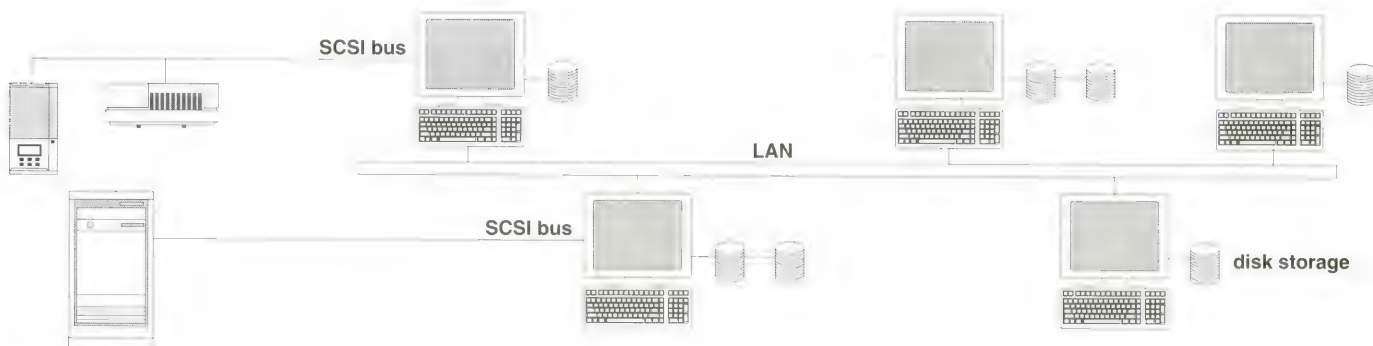
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# Getting Started

Martin Knapp

# With Client-Server

*Today's* client-server systems are largely a matter of building blocks. The trick lies in knowing which ones to choose and how to fit them together. In fact, once you start investigating client-server, you will certainly find that the number of products and possibilities is overwhelming. It's obvious that client-server computing is no panacea, and like any other development in IT requires planning to be a success.

A report writer is a good pilot project to start with. The advantages for users are better access to information; and for IS managers, it is a read-only application, so there is no risk of damaging your live databases if it all goes wrong. I'd like to share some of my experiences in developing a report writer in a client-server environment for Microsoft Windows.

But first, let's assume the following: you have already chosen which database to use and have installed it; your network will be LAN-based (physically it may be a WAN, using bridges and routers, but logically a LAN); your clients are PCs running under Windows; and finally, your server is a midrange system, rather than a mainframe.

First the application. It could be a spreadsheet like Microsoft Excel, a custom application written in Visual Basic or an off-the-shelf application designed to run against a particular database. For our example, we'll use Fantasia Reporter from Proactive. A database application on a PC is not fundamentally different from one on the host. It has to access the database by submitting SQL statements to procedures supplied with the database, commonly known as Application Program Interfaces (APIs). Naturally, every database has its own API (see the database client software in *Figure 1*), and they are all different. This means that while the same SQL statement

can be submitted to Oracle or Sybase and obtain the same result, they have to be submitted through APIs which are completely unrelated. If you are developing a Visual Basic program using Oracle APIs, for example, you will not be able to run the same program against a Sybase database without rewriting all the database calls.

## OPEN DATABASE CONNECTIVITY

BECAUSE IT REQUIRES that different elements of a complete system should plug together interchangeably, it leaves a hole in the open systems tapestry. One solution is to use Microsoft ODBC (Open Database Connectivity), effectively providing a translation service between an API with a standard format on the application side, and the APIs belonging to the target database. However, the important thing to understand is that ODBC does not replace the target database API. It only provides a standard way of using it. This explains the dotted line in *Figure 1*. Depending on which database type you are accessing, the reporter will use the native API or the appropriate ODBC driver.

Although the SQL language is reasonably well standardized, the same is not true for the APIs which transmit SQL statements to the target database. This clearly posed a problem for the database vendors, who are targeting the open systems, interoperability market. The result was the creation of the SQL Access Group (SAG), made up of leading hardware and software manufacturers, one of whose remits was to design a standard Call Level Interface. ODBC is Microsoft's implementation of this standard, and so has the double advantage of being an



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implementation of an official and a de facto industry standard.

Microsoft's ODBC consists of two things: a set of procedure call definitions to open, access and close an SQL database; and ODBC drivers (APIs) for Microsoft products. Since Microsoft published the ODBC standard, other manufacturers have developed drivers for various different databases. Along with your ODBC driver, you will get software which Microsoft makes available. The software manages the accessed drivers and the databases, so installing an ODBC driver on your PC will add the ODBC standard icon to your Control Panel.

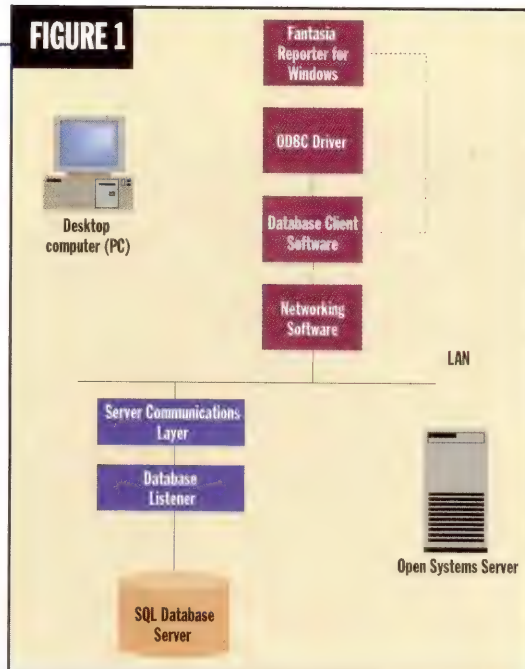
Click on the icon to access the ODBC Manager, which allows you to configure a Data Source. This is a combination of driver type and target database. By choosing the "Add" button, you can configure a new Data Source. Here is where the standard ends, and the particular

target database parameters take over.

Using ODBC gives great flexibility to developers, because an application written against one database will work equally well, in principle, against another. For example, a new application can be prototyped using ODBC calls to a Microsoft Access database, and then be run in production against an Oracle database, without any modification. Alternatively, standard packages like spreadsheets can use ODBC to upload data directly from a selected data-source.

For users, ODBC has the advantage of making all data sources look the same. If we take our spreadsheet example again, a user might want to draw data into the same spreadsheet, but from different databases (for example, databases held on different systems). Using

**FIGURE 1**



ODBC, be noted that ODBC is the only realistic option for general connectivity. Use of the Gupta APIs, which HP adopted before the ODBC standard had gained widespread acceptance, is not generally available or supported and is now

## MOVING TO NT CLIENT-SERVER?

The industry's most popular software re-engineering approach consists of a three-phase process. The first phase distills the original software source code and documentation into its underlying requirements and specifications. The second phase reviews these requirements for ambiguities, completeness, reasonability and practicality. Then, the final phase consists of a traditional software life cycle, or forward engineering project, targeting a new language and environment.

This approach has achieved a high success rate when the project is performed manually by one or two individuals with intimate knowledge of the original system. Using this same approach for larger projects and migrations attempted by outsiders, the success rate is roughly two out of three for project completion and less for migrations deemed successful.

Targeting your migration into Windows NT helps tip the odds a little in your favor. Windows NT was built to be portable and interconnect with a wide and expanding variety of systems. The expected scalability of Windows NT makes it an attractive target for migration. And upon successfully migrating your system, Windows NT offers POSIX compliance, C2 security compliance and platform portability. Virtual processing promotes safe asynchronous multitasking, while security features such as enforced logon, protected objects and auditable file access provide a secure operating environment. Using TCP/IP, Windows NT interfaces readily with UNIX environments, and provides connectivity

to networks via utilities like Telnet and ftp. It also delivers clean OS/2 interfaces.

## IT'S YOUR MOVE

Consultation and software re-engineering services provide several advantages when migrating to Windows NT. For example, these service companies will often have formed strategic alliances with other companies with related technologies to complement their efforts.

Despite their experience, you should still ask service candidates specific questions about your project. Do they guarantee to provide a solution? How do they intend to test and prove the success of the migration? Must you freeze your software baseline for the entire duration of the project? If so, what recourse do you have if the project goes into overtime? How much of your resources (people, hardware, test suites and processing time) will be required to support their work? How do they handle translation of hardware dependencies?

If you have a library of historical data used by your existing system, can they guarantee full bit-wise retrieval and computational compatibility? If you own proprietary interfaces, how do they intend to port these into Windows NT and all of its intended platforms? Keeping these issues in mind should help you to have little trouble migrating to an NT client-server environment. — *Barry G. Litherland is director of Federal Services for ALYDAAR Software Corp. (Madisonville, La.).*



restricted to a few of the first products to support IMAGE/ SQL, such as the Gupta SQL Windows 4GL.

The disadvantages of ODBC include the following:

**Performance** — Using ODBC does not remove the necessity for database-specific APIs. It simply provides a translation service between SAG standard calls and native calls. This translation obviously implies a certain processing overhead, although precisely how much will depend on what functions are being executed, and on the relative efficiency of different manufacturers' implementations of ODBC.

**Functionality** — The ODBC standard is to some extent a lowest common denominator, so you may find that the database you are using provides functionality in its native APIs which is not available in the ODBC calls.

**Level of conformance** — Although the degree of support for ODBC from different database vendors is increasing rapidly, it is still the case that the ODBC standard is emerging rather than established. Everybody agrees that ODBC is a good thing, and everybody has agreed to support it. They just haven't yet agreed exactly how it is implemented. This means that ODBC has still not achieved complete interchangeability between databases. And, an application developed using ODBC against one database will not necessarily work against another. However, this situation is changing rapidly.

ODBC drivers come from a variety of sources, depending on the database you are using. Microsoft products (such as Office) will automatically install a whole series of ODBC drivers to handle PC-based databases (dBase, Access and FoxPro). Oracle's ODBC driver can

be acquired from Oracle, or downloaded from CompuServe. The Sybase ODBC driver is manufactured separately by third-party Q+E. The ALLBASE/SQL driver (which is the same for IMAGE/SQL) is distributed by HP with the database software. To determine what you need to do to install the ODBC driver for your particular database, it is easiest to consult the manufacturer of your target database.

## PC NETWORKING

THE NEXT piece we need to weave into our tapestry, is the PC networking software. Of course, this has to be considered in conjunction with the communications software that will run on the host, and the kind of hardware connectivity you have installed. In our example, we are running over a LAN, and

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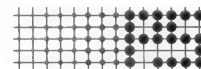
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chances are we will be using the TCP/IP protocol. However, depending on the database you are using, the hardware link could be a LAN running NetWare, an IBM VTAM connection or even an asynchronous line. Getting this layer right is crucial, because in the world of distributed open systems, everything in the company will come to depend on the networking backbone of information distribution.

Now we've managed to plug our application into the database client software on the PC, the PC database calls still need some way of addressing the database listener on the host. This means going across the network, so we have to consider the question of which networking software to plug our database client into. In the client-server component diagram (see *Figure 1*), we have implicitly made the assumption that the network is an Ethernet LAN, though this need not necessarily be the case.

In choosing our PC communications product, there are a number of limiting elements here which must be kept in mind: the PC software may only "talk" to networking software from certain manufacturers. A year or two ago, this was a serious limitation. But now, it is much less and the Windows Sockets (Win-

Sock) standard has become more widespread. And just as important, the database listener may only talk to certain communications servers on the host. If you are using HP's ALLBASE/SQL, for example, then your networking must use the NetWare SPX/IPX protocol (in which case you must have portable NetWare installed on the host HP 9000 or HP 3000) or TCP/IP. In either case, serial connection is not an option, although some third-party products may help you to get over this.

**Using TCP/IP will allow  
your PCs and servers to  
plug into the Internet.**

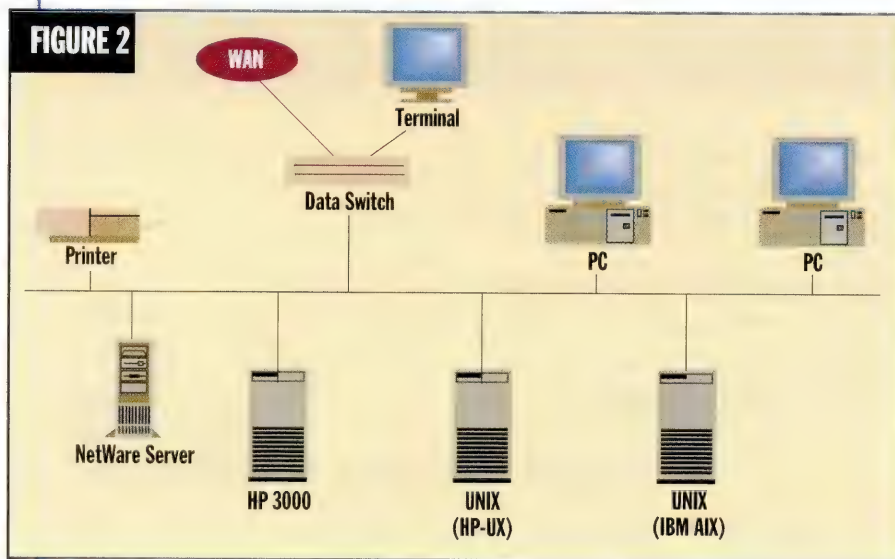
Before the Windows Sockets standard was established, getting PC applications software to "talk" to PC networking software presented the same kind of problems as talking to native database client software did before ODBC. The networking software would supply a series of procedures (APIs), which the applications software could call in order to connect to the network. The drawback with this was that every networking package had a

different API. A familiar example for HP users is the Reflection Network Series, which provided the LAN connectivity for the Reflection Terminal emulator. At the same time, WRQ provided procedure calls for people to write applications software. The problem was that the applications written with WRQ procedure calls would only work with the WRQ network product and not with any other.

To resolve this problem, Microsoft introduced the Windows Sockets standard. This is a series of standard procedure definitions, and in this sense is similar to ODBC, although Windows Sockets has no equivalent management interface. The principle of Windows Sockets is that any PC application software that makes WinSock-compliant procedure calls should be able to "talk" to any PC networking software that also is WinSock-compliant. Consequently, users have far more flexibility in selecting their networking software. In our example, the PC application we are concerned with is in fact the database client software. So, you will need to check whether the latter is WinSock-compliant. If not, which manufacturers' networking software does it support? If we take the case of IMAGE/SQL, if you do not have a WinSock-compliant networking package, your choice is limited to HP PC NS ARPA (once known as AdvanceNet) or NetWare 3.11.

For many HP 3000 users who are currently running across the old Reflection Network Series, it will therefore be necessary to replace their current networking software, with the new Reflection TCP/IP which is WinSock-compliant, or with another networking product altogether, like Chameleon. This is likely to be a significant part of the expense of installing a large network.

The next thing you will need to take into consideration is whether you already have any other protocols running on your network. In our example (see *Figure 2*), the PCs are using the network to connect to a





NetWare server, and running the NetWare SPX/IPX protocol. If we want a client-server connection to IMAGE/SQL on the HP 3000, then we need to run NetWare on the HP 3000; or to run TCP/IP alongside NetWare on the PC, and it works all right afterwards; or to install a more recent version of NetWare which uses TCP/IP.

## TCP/IP ADVANTAGES

TCP/IP OFFERS a number of advantages. TCP/IP is a widely used industry standard. In fact, it comes as part of the operating system under UNIX and is available as part of MPE/iX. It is fast, efficient and reasonably easy to manage. Because it also is the protocol used on the Internet, using TCP/IP will allow your PCs and servers to plug into the Internet. TCP/IP comes with a number of other services, including ftp (file transfer protocol) and NFS (network file services). NFS is particularly interesting, because there are several PC implementations of TCP/IP (e.g., Chameleon, FTP's PCTCP) which include NFS. This allows you to define directories on a UNIX system as extra PC drives. Therefore, in our network, assuming that the NetWare system is only used as a file server, we could replace the NetWare server with disk space on the UNIX system.

One final point is worth making. Like most PC software, you can easily buy your networking software off-the-shelf, install it and forget about it. Consider, however, that your networking software is every bit as vital to your operations as your operating system (MPE or UNIX). What will you do if bugs appear, or if advances in the technology on either the PC or the server cause the networking software to lose compatibility with some other element of the system?

Below the communications layer on the host comes the database listener, which performs much the

same function as the database client software on the PC. It listens out for connection requests from clients, and establishes the link between a client application and the RDBMS. Each RDBMS, of course, has its own listener software.

You don't have too much choice in the host listener, because it is effectively a part of the RDBMS that you have chosen. You may need to specify which communications protocol you intend to use when ordering the RDBMS. Although on UNIX servers, this will generally be TCP/IP. Host listeners that use TCP/IP work as a "port" alongside other TCP/IP services such as Telnet or ftp.

You may need to configure your server "services" file in order to make sure that there is no clash between the TCP port number assigned to the listener and other services already installed on your system. Your installation documentation should tell you how to do this. You also will need to start and stop the listener daemon, and this should be included in your database startup and shutdown routines.

On the HP 3000, the IMAGE/SQL listener will run in a separate job (unlike UNIX, MPE is not a black art, and so has no daemons), spawning child processes for each client logon. Therefore, you may need to modify your job limits to take account of this extra job.

So there we have it. The application is passing SQL statements to the database client routines (perhaps via ODBC); and the database client routines are talking to the PC networking software. The network is up and running, and the SQL statements are being picked up by the host listener, which is passing them on to the database. The results are successfully going back in the opposite direction, and amazingly enough our first client-server application is up and running! — *Martin Knapp is senior software engineer at Proactive Systems (Kent, United Kingdom).*

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# *A Guide To*

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# CDE HP VUE Users

*By now*, you have probably heard a lot about CDE, the Common Desktop Environment. You have heard about how four of the largest companies in the computer industry have gotten together to develop a “desktop for UNIX.” Each contributed its strengths: IBM brought their experience with Common User Access (CUA). Sun came with OpenWindows. UNIX Systems Labs (USL; a spin-off from AT&T Bell Labs) brought their UNIX experience and their own desktop technologies. And HP contributed HP VUE.

The plan was to pick the best of each, and deliver a sample implementation in the first half of 1994. Vendors could then take the sample implementation to create their own products. To ensure that the process of turning the sample implementation into product would not create the tower of babel that we have today, the CDE partners turned to X/Open. This standards organization would be the holder of the interfaces to CDE and issue a CDE brand to products that met the CDE standard.

The announcement of CDE took place at Uniforum in 1993, and a developers’ conference occurred in San Jose in October of that year. Each attendee received a CD-ROM with a snapshot of CDE. A second snapshot of CDE appeared in April 1994.

A lot has happened since the 1993 announcement. Novell has bought USL and continued its commitment to CDE. CDE itself has changed too. Rather than being a mix-and-match of dissimilar components, CDE has taken on its own personality, a homogeneous desktop that is indeed better than the sum of its parts.

But the close blending of CDE components has taken longer than originally budgeted. Jon Brewster was HP’s representative to the multivendor CDE management team that defined the content of CDE on an ongoing basis. He says, “When we really got into it, and analyzed where we were and where we could be, we realized that we could tackle the bigger problem and solve some more fundamental problems, and create an architecture that would last rather than something that was mashed together....” The designers placed a lot of emphasis on developing stable APIs that would not change in subsequent releases. The result took two years rather than the originally budgeted one year. The sample implementation was completed in the first half of 1995 instead of the planned 1994, and Uniforum 1995 marked the official end of the project. In Brewster’s view, CDE “only tacked six months onto what is normally an 18-month cycle.”

In this world of acronyms and trademarks, there are bound to be inadvertent conflicts, and so it is with CDE. It seems that another company has a trademark for the acronym CDE for their product. The exact legal position and resolution of the name conflict is yet not clear. In this article, however, CDE refers to the sample implementation of the Common Desktop Environment being developed by HP, IBM, Novell and Sun.

This article gives you a view of how things have changed from HP VUE. The full X/Open specification for CDE comprises about 1,000 pages and weighs seven pounds (including binder), and it makes for interesting



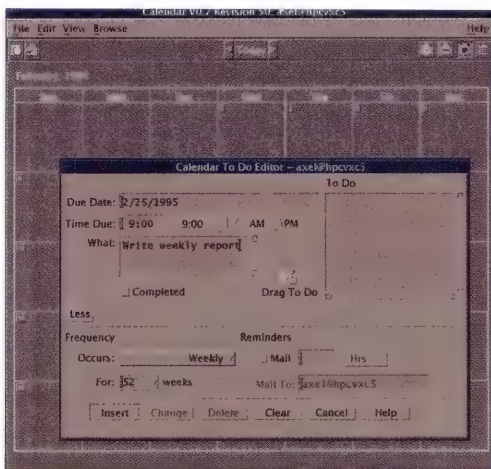
**IBM brought their experience with Common User Access (CUA) .**

**Sun came with OpenWindows. USL brought their UNIX experience and their own desktop technologies. And HP contributed HP VUE.**

reading. This article, however, describes only the areas of CDE which most interest you, the HP VUE user.

### THE USER'S VIEW

AT FIRST GLANCE, the CDE desktop looks refreshingly familiar to HP VUE users. The front panel at the bottom of the screen switches the user among work spaces and launches familiar applications such as the file manager, mailer and text editor. A new feature is the ability to add a new item to a subpanel simply by dragging the item and dropping it on the subpanel.



*The CDE Calendar Manager allows you to schedule appointments and to-dos.*

Clicking the calendar in HP VUE did nothing. But in CDE, it brings up the Calendar Manager. This is a full-featured tool for your appointments and to-do lists. You can schedule repeating appointments such as weekly staff meetings, and the Calendar Manager can remind you when it is time to head off to that important rendezvous. The tool

bar provides a shortcut to get to common functions such as creating new appointments. Particularly interesting is the multiuser capability. Tell the calendar manager with whom you wish to meet and it will identify free times for those people. Pick a time and the calendar will pre-address a mail message you can send to announce your meeting.

The CDE mailers interface is reminiscent of the public-domain xmail, but offers many more features. It has all the standard features such as send, receive, reply and forward. It supports the MIME RFC-822 message format, so you can include attachments in your E-mail. As in other CDE components, you can drag and drop files and even selected text from other components into the input text area when you compose new messages.

The terminal emulator, an xterm replacement, sports a friendly new look with a menu bar to set popular options. The CDE sample implementation does not include a replacement for hpterm.

Like VUE, CDE presents a strongly data-driven model. Data is of various types and a certain set of actions can operate on that type of data.

An action typically invokes a program. The file manager shows icons that indicate the file type next to the file name. A set of folder icons provides a graphical view of the path to the current directory.

Some CDE components show little change from HP VUE. The text editor, dtpad, is little different from vuedpad. Help, as with VUE, is closely integrated with all applica-

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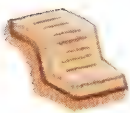


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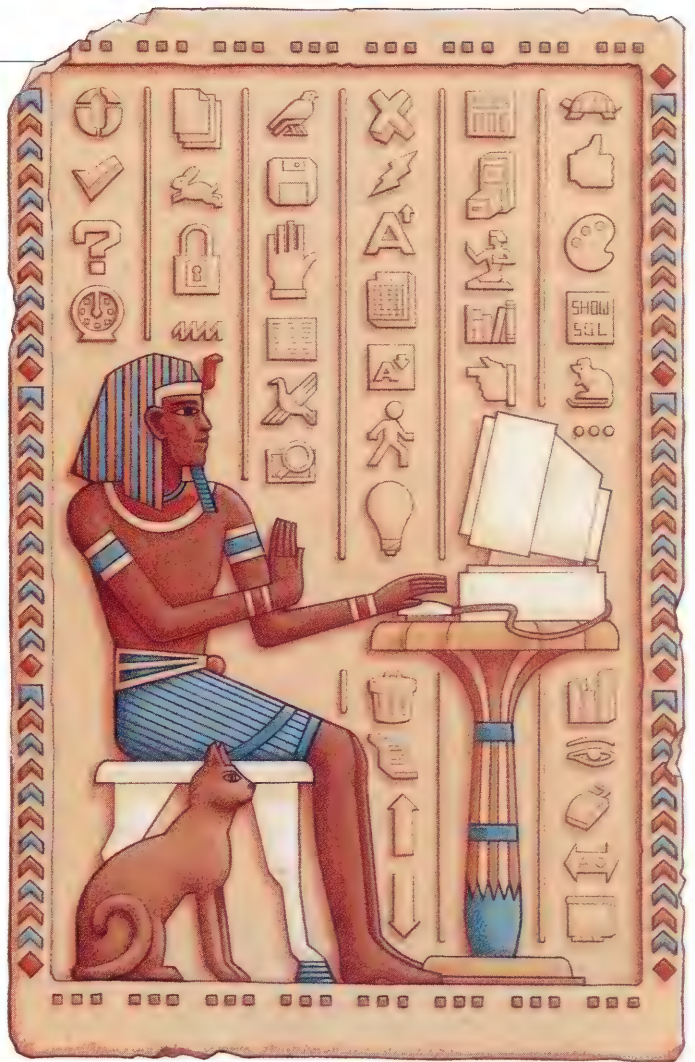


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tions. It works similar to HP VUE, but has common features like Backtrack conveniently located as buttons on the help window.

Tying the user interface of the CDE components together is the Style Guide. It builds on the Motif 1.2 Style Guide and was developed in cooperation with OSF.

And oh yes, there's also a calculator for the desktop. It can help you deal with favorite financial and scientific problems.

## THE PROGRAMMER'S VIEW

PROGRAMMERS get access to a whole new set of APIs that provide direct access to virtually all capabilities of the CDE desktop. And those APIs are the same across all platforms, no matter who the vendor is. This enables the development of applications that are tightly integrated into the desktop.

Data typing and actions are key to the data-driven model used throughout CDE. Applications can register various data types and actions with CDE so they appear correctly in the file manager. CDE discourages use of command line interfaces in favor of actions. Action communication is therefore implemented via ToolTalk, but application developers are shielded from having to learn ToolTalk directly. The action layer provides a level of indirection that can cross system boundaries and allows components to be readily replaced.

All CDE components have actions that represent particular activities. This provides a link among components without requiring detailed knowledge of each other. For instance, to provide a link to E-mail, an application can invoke the "Compose" action. Some components also are available in widget form so an application can directly embed them in its windows. For instance, the text editor and terminal emulator are available as widgets. The Help system continues to provide the widget API like that in HP VUE.

Speaking of widgets, CDE also

has a version of Motif toolkit (Motif 1.2.3) which will be available on all CDE platforms. This eliminates the Motif "versionitis" that has plagued some cross-platform development to date. It also adds three widgets: Combo Box, Menu Button and Spin Box. They are all useful in dialogs where a user has to select one from a number of choices. The Combo Box combines a text field and a list. Users select an item from the list and it automatically fills in the text field. The Menu Button provides for functionality similar to a cascading menu, but anywhere in a dialog. Finally, the Spin Box provides a space-saving way to present multiple choices. Users can cycle through the various options available.

The CDE desktop components support drag and drop extensively. By using the new public drag and drop API, all applications can support direct manipulation.

Cross-platform applications have often suffered from a lack of fonts guaranteed to be available on all X servers. For example, this can lead to "Font Not Found" errors when an application running on an HP host is displaying to a Sun workstation. Motif's fallback is to use the "fixed" font, which is often hard to read.

While CDE does not include a common set of fonts, it does include a common set of font names that applications can specify. The format of the names fully complies with the X Logical Font Description (XLFD) standard. The font names correspond roughly to the 13 fonts commonly found in PostScript printers.

All platforms will honor the font name, but may fill the request with their own platform-specific fonts. For instance, an application may request **-dt-interface system-medium-r- normal-xs sans\*-\*-\*-\*-\*-iso8859-1** and know that a font by that name will be available. On HP, that font may be from the Univers family. On Sun, it may be a Lucida font. The fonts may have different metrics, but the applications intent (bold, italic and serif) will be preserved.

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To ease program development, CDE has two new components: dtksh and dtbuilder. Dtksh is just what its name implies. It is a Korn shell that supports the CDE APIs including Xlib and Motif. It is just the ticket for developing shell scripts with a GUI interface. The Builder is a GUI environment for developing applications for the CDE desktop. Applications can be designed as modules that combine into projects. The Builder can then also build the final application. The Motif User Interface Language (UIL) serves as the file format to export and import code. Easy to forget is the icon editor, which makes it easy to create icons in the XPM file format used by CDE.

### FROM SAMPLE IMPLEMENTATION TO PRODUCT

YOU HAVE BEEN reading about the sample implementation of CDE. But what about products you can buy? And what about X/Open standards?

The entire sample implementation including source, object, documentation and test suites belongs to each of the four partners. All have committed to deliver products based on that implementation. "HP is committing to rolling full-tilt to CDE" says

Brewster. Current plans aim for a "bumpless transition," he adds. HP conversion tools can convert your HP VUE configuration files to CDE.

**The X/Open specification and the sample implementation source code ties together the multiple products based on CDE.**

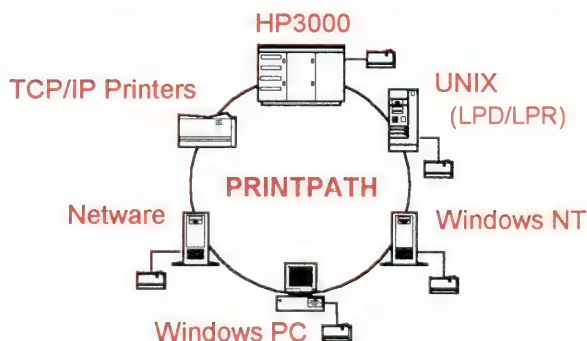
There also is a lively market in sublicensing the CDE sample implementation. Platform vendors who were not part of the initial development may license CDE from any of the four sponsors and deliver their own product. Even software vendors are getting into the act. "It's going very well," says Dick Thompson who manages the sublicensing relationship for HP. HP decided to work with TriTeal Inc. (Carlsbad, Calif.) to handle sublicensing to platform vendors. When vendors call HP regarding licensing CDE, they are directed to TriTeal. TriTeal, in turn, has selected about 10 platforms as porting targets, says Thompson. TriTeal also has developed their own shrink-wrapped product, the TriTeal Enterprise

Desktop (TED) product, which includes technology in addition to CDE. Thompson adds, "Companies who want a consistent desktop across all of their UNIX systems have been able to go to TriTeal for HP VUE and will be able to go to TriTeal for CDE" in the future.

The X/Open specification and the source code of the sample implementation are what ties together the multiple products based on CDE. The source code shared among the sponsors ensures that everyone starts out on the right track, and X/Open specifications and branding keep them there. The four sponsors have delivered specifications for CDE to X/Open. After review by a working group and a vote by the X/Open Technical Managers, CDE has become an X/Open standard. The exact name is still under discussion, but XCDE (the X/Open Common Desktop Environment) is the current favorite. X/Open will issue an XCDE brand to products that conform to the specifications. This is the guarantee that the product, whatever its name or its vendor, meets the XCDE specification.

X Windows has come a long way since it emerged from the Project Athena research labs in the mid-1980s. Along the way, it has gained a toolkit, Motif, and now UNIX sports a common desktop: CDE.—*Axel Deininger is a scientist/engineer with HP's Workstation Systems Division.*

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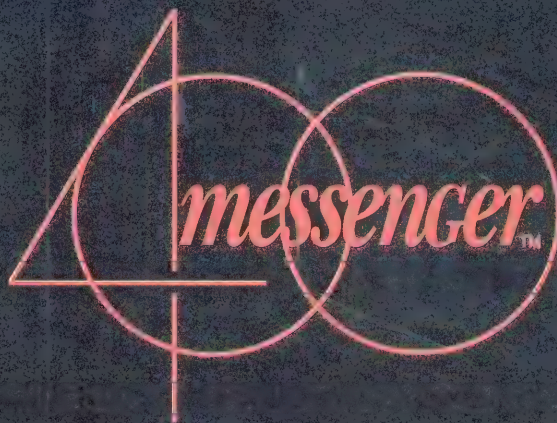
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CIRCLE 235 ON READER CARD



# Legent Bends With The Prevailing Winds Of Change



## PREVAIL/XP-AUTOMATION POINT

- Creates a single point of control for all automation activity on the enterprise information system.
- Incorporates HP's OpenView OperationsCenter
- Supports HP 9000 Series 700 workstations

### Legent Corp.

575 Herndon Pkwy.  
Herndon, VA 22070  
tel: (703) 708-3000  
fax: (703) 708-3209

CIRCLE 352 ON READER CARD

**H**ave you've seen Legent's (Herndon, Va.) full page ad featuring a reproduction of a M. C. Escher lithograph? Titled "Ascending and Descending," it shows two groups of hooded figures — one group doomed to ascend forever; the other group doomed to descend forever on a staircase that somehow loops back on itself.

So what's the message? While hardware may change, while application software may change and while even the central computing paradigm may change, the problems in controlling the operations, managing the system resources, storage and problem resolution remain the same.

Prevail/XP-Automation Point for HP-UX is the first product from a joint development agreement first announced in April of 1994 by Legent and HP to integrate HP's OpenView OperationsCenter with Legent's systems management products. Built on Legent's XPE (Cross Platform Environment) strategy, the Prevail/XP products extend the automation of systems management to many different platforms.

Prevail/XP-Automation Point is based on Legent's manager/agent technology which distributes intelligent automation across the enterprise. The intelligent agents are software products which reside on the target platforms, ensuring comprehensive real-time management based on local information.

Prevail/XP-Automation Point for HP-UX runs on an HP 9000 Series 700 workstations serving as the single point of control for all automation activity in mainframe and client-server environments. It allows administrators to view and automate multiple sessions on a large variety of platforms like MVS, VM, VMS, OS/2 and various flavors of UNIX.

Prevail/XP-Automation Point can invoke visual or audible alerts either locally or through paging networks. It

runs standalone or integrates with other Prevail/XP products. The software also enables administrators to set up what Legent calls "automated self-healing" systems and networks for problem responses.

Prevail/XP-Automation Point for HP-UX is one member of the Prevail/XPE series which consists of modular integrated products in five product suites: automated systems operations, output management, production control, device management and problem management. Since XPE's introduction, Legent has delivered a number of products that use XPErtware, its message-oriented middleware product. XPE offers a standard communication layer insulating systems management applications from the underlying platforms and protocols.

Prevail/XP-Automation Point for HP-UX costs \$30,000 combined with HP OpenView OperationsCenter. Prices for the Prevail/XP-Automation agents begin at \$400 per server.

— John P. Burke,  
HP 3000 Columnist



# Join The Object Team With Cadre's ProDev



## OBJECTTEAM/PRODEV

- Emphasizes visual models
- Uses an X/Motif-standard GUI for display on any X-based system
- Prices start at \$2,200

### Cadre Technologies Inc.

222 Richmond St.  
Providence, RI 02903  
tel: (401) 351-5950  
fax: (401) 455-6800

CIRCLE 351 ON READER CARD

**F**or many developers, programming has become so complex that standard edit/compile/debug tools are not sufficient; they come from an era when the technology was simpler. Wouldn't it be nice to have a comprehensive and integrated toolset to help you through each stage of the programming cycle?

Cadre Technologies Inc. (Providence, R.I.) is trying to fulfill that need with Object-Team/ProDev, a development environment for complex programming in C and C++. ProDev has been available for the Silicon Graphics (SGI) platform for several years, having evolved from SGI technol-

ogy. ProDev's first port was to Sun's Solaris platform.

An HP port should now be available, especially because HP has been facilitating the process for Cadre. "HP has been instrumental in the success of moving this product forward," says Steve Lafferty, director of product marketing at Cadre. "In fact, we are in discussions with them about OEMing their compiler. We want to support the system compiler, but then we also want the very best bundled solution."

The ProDev development environment breaks down into four parts: a source-level debugger, a static analyzer, a C++ Browser and a Build Manager/Analyzer. ProDev uses an X/Motif-standard GUI for display on any X-oriented system. The emphasis is on visualization, using graphical displays as a technique to develop mental models that will increase programming efficiency.

The debugger allows over 15 views into the code, which are dynamically updated as the user moves through the program. The debugger handles millions of lines of source code and executables over 100 MB. Debugger components like the Expression Evaluator and Structure Browser allow interactive handling of the visualized data.

The static analyzer scans the lines of code, and a results filter allows for selective display. The analyzer operates in dual capacities: scanner mode (based on fast pattern recognition) and compiler mode (generates a database from symbol table information, allowing for complex queries). Incremental changes to the fileset under analysis can be made without recreating the whole database.

The C++ Browser includes a class information window, a class graph window, a static analysis window and a call graph window. The Build Manager/Analyzer lets users launch rebuilds from within the development environment. It displays makefile dependencies graphically, including a call view.

The Cadre product strategy is to provide a complete object-oriented development solution that covers all three development modes: modeling, component assembly and coding. ProDev can handle applications in excess of 1 million lines of code.

Pricing for the HP release will start at \$2,200 and the entire development environment costs \$3,150.

—Jim Esch,  
Contributing Author





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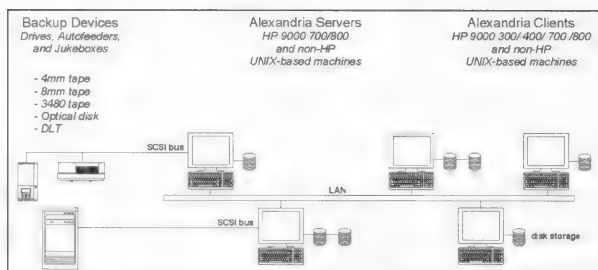


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# The Library Of Alexandria



## ALEXANDRIA LIBRARIAN

- Supports a command line and GUI interface
- Supports 4mm, 8mm, 3480 tape and optical media on individual drives, autoloaders and jukeboxes
- Server costs \$6,000 for a typical workstation configuration; Client costs \$750 for a typical configuration

### IEM Inc.

1629 Blue Spruce Dr.  
Fort Collins, CO 80522  
tel: (970) 221-3005  
fax: (970) 221-1909

CIRCLE 353 ON READER CARD

**T**he Alexandria Network Backup and Archive Librarian, OEM'd from Spectra logic (Boulder, Colo.) by IEM Inc. (Fort Collins, Colo.), automates data backup and archiving on heterogeneous UNIX networks. Scheduled backup of remote computers can be managed from a single central computer. Alexandria's scheduler also can restart backups that failed or did not start at all because a machine was down or a device was unavailable.

Alexandria keeps track of all the media and media contents (the Librarian), and automatically loads the proper media for each store or restore operation. If a standalone drive is used, Alexandria treats the drive as if it were contained within a library, but in this case issues requests for a person to act in place of the library robotics and mount or dismount the appropriate media.

Alexandria's internal data-

base gives users the ability to determine where and when specific files were stored. Search criteria include actual name, patterns, time, user and group. Combinations of search criteria can be used to quickly obtain the desired information. Alexandria also tracks media location (inside or outside the library) and aging (physical and logical).

Alexandria uses a proprietary tape format that improves the performance of restore operations, at the expense of using slightly more tape. It also allows store sets, and even single files, to span multiple media volumes. Furthermore, in case of media failure, it can retrieve information beyond the failure point, unlike conventional UNIX utilities. For compatibility with other systems,

Alexandria supports writing tapes in tar and cpio formats. All UNIX file security controls, maintaining read/write and execute access for all files are preserved. Users can backup and restore only those files which they own or have read/write access. Alexandria provides an extra level of security by restricting file recovery to the specific machine from which the backup occurred. Several kinds of compression (including LZW) and encryption (including crypt and the U.S. government's encryption

standard DES) are supported.

With SSCL (Serial SCSI Command Language), IEM has eliminated the need to write special device drivers for device control. SSCL is a piece of hardware that attaches to the SCSI bus via an RS-232 port. This device communicates with and controls the storage devices and automated media changers. The SSCL interface is available in a stand-alone configuration or as a built-in option in certain media changers.

Alexandria supports backup and archiving to individual drives, autoloaders and jukeboxes using 4mm tape, 8mm tape, 3480-type tape or optical disk as the storage media. Supported platforms for server and client include the HP 9000, Sun SPARC, IBM RS/6000 and most other popular UNIX systems. Using database personality modules, Alexandria interfaces with Oracle, Informix and Sybase.

Pricing is by server, client and personality module. Each machine with a library attached requires Alexandria Server (priced at \$6,000 for a typical workstation configuration). Alexandria Client is priced at \$750 for a typical configuration.

— John P. Burke  
HP 3000 Columnist





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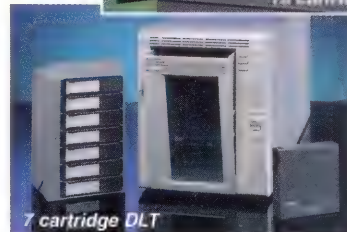
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6 cartridge 4mm



16 cartridge 4mm



7 cartridge DLT

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President and CEO  
Extended Systems Inc.

5777 N. Meeker Ave.  
Boise, ID 83713  
tel: (208) 322-7575  
fax: (208) 327-5009

CIRCLE 354 ON READER CARD

**W**hat do you do when you retire from HP? Cash in your stock options? Become president and CEO of a small, privately-held and employee-owned company? In June 1994, Ray Smelek, a 37-year veteran of HP, chose the latter. Smelek is now president and CEO of Extended Systems Inc. (ESI; Boise, Idaho).

It's a natural fit for Smelek, the person responsible for launching HP into the laser printer business in 1973. ESI was founded in 1984 by a group of HP and IBM engineers with a simple mission: to provide printer sharing devices for HP LaserJet printers. ShareSpool, ESI's first product, lets three PCs share one printer. The first products worked with HP 150 and IBM PC/XT computers.

Since then, ESI has continued to introduce other innovative printer sharing products. Like ShareSpool XL — a series of memory-buffered expansion cards and external printer-sharing devices for HP LaserJet, Color LaserJet, DeskJet, DesignJet and other vendors' printers. According to Smelek, ESI's ShareSpool business is growing 20 to 30 percent a year. But ShareSpool is primarily a non-networked solution. So, network print servers were a logical next step for ESI.

ESI's ExtendNet and Pocket Print Servers are single and multiprotocol, multiport network print servers providing support for LAN Manager, LAN Server, NetWare, TCP/IP, Vines, Windows NT and AppleTalk networks.

In 1994, an Ethernet hub/print server — Extend Hub — was added to ESI's print server repertoire. Because flash memory is included in all ESI's network products, "changing protocols is easy," notes Smelek. "We give [our customers] a migration path."

Other ESI products include peripheral devices which add PC faxing and plain-paper fax reception to any HP LaserJet. And Advantage Xbase Server, database software for migrating Xbase data in client-server environments.

Since introducing its JetEye infrared (IR) adapters for desktop, portable PCs and printers, ESI has expanded their corporate mission beyond selling print servers. "We worked with HP on the 95LX [HP's first palmtop PC introduced in 1990]," says Smelek. The 95LX, 100LX and 200LX palmtops all have integrated ports as does HP's OmniBook notebook.

Other vendors have now followed suit: Digital, Gateway, IBM and Sharp are all shipping notebooks with integrated IR ports. Meanwhile, HP is now

shipping its LaserJet 5P, a printer with an IR port that works with ESI's JetEye driver.


With over 500,000 products sold worldwide, support is a "core value" at ESI, says Smelek. All hardware products come with a 30-day, money-back guarantee and five-year cross-ship warranty.

According to Smelek, 75 percent of ESI's business is done in the U.S.; international sales make up the remainder. However, wholly-owned subsidiaries in Germany, France and the UK, as well as distributors in other countries, are helping ESI achieve a more balanced revenue stream. "Right now, Smelek says, "we are starting to look at the Asia Pacific region as well as in Central and South America." Eventually, Smelek foresees a 50/50 split.

Although current revenue figures were not disclosed, Smelek says ESI is about the same size today that HP was when he joined them in 1957. But he is intent on developing a management team to take ESI (with 200 employees) to "a \$100 million plateau." Ultimately, says Smelek, "We want to help our customers achieve the optimum return on their network investment."

— George A. Thompson,  
Technical Editor





# WHICH UNIX SYSTEMS MANAGEMENT VENDOR HAS MORE THAN 4,000 COMPANIES APPLAUDING IN UNISON?

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CIRCLE 136 ON READER CARD



# Optical Conclusions

## *Hot Times For A Way Cool Medium*

George A. Thompson

**I**f you're optically smart and storage hip, you'll recognize the following trends in the optical storage market:

With 650 GB of storage capacity per side, a current 5.25-inch (ISO-standard) optical disk can hold as much as 1.3 GB of data (1.2 GB if you are using 1,024 sectors). That's double the original capacity of one-sided optical disks, first introduced in 1989. That's also why a 1.3 GB optical disk is often referred to as 2X media in industry jargon. Higher you say? Although 3X media is now available (introduced by Hitachi in 1994), it has not been embraced by the leading optical drive manufacturers like HP.

Instead, most of the attention and R&D budgets of drive and disk manufacturers are focused on breakthroughs that will bring about 4X media. For example, shorter wavelength lasers, which have already gone from 820 nanometers (nm) to 780 nm. According to a white paper from Verbatim Corp. (Charlotte, N.C.), a 670 nm green laser should be available in 1995. Other technology advancements include reducing track pitch to 1.2 microns (which has already gone from 1.6 to 1.4 microns) and a switch from pulse position to pulse width zones (a customized way of increasing data density). HP and IBM are

expected to ship the first 4X drives in the latter part of this year.


Because of their modular construction, the capacities of optical jukeboxes (or libraries) can be increased to meet the needs of the largest enterprises. According to Freeman Associates Inc. (Santa Barbara, Calif.), optical libraries using fewer than 30 disks are the largest segment of the market. However, optical libraries using 30 to 99 disks, which have been the revenue leaders, will give way to smaller devices by next year. Optical libraries using 100 or more disks represent the smallest product segment, but are still growing at

24 percent per year.

### LET ME TAKE YOU HIGHER

REWITABLE AND write-once 5.25-inch optical disks are used in multifunction optical drives. Using magneto-optical (MO) technology, multifunction drives are still not as fast at finding data as are magnetic (hard) disks. But optical drive manufacturers have kept multifunction drive access times at or near competitive levels with magnetic disks through higher rotational speeds (from 1,800 to 3,600 rpm) which increases transfer rates;





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CIRCLE 249 ON READER CARD



# OPTICAL CONCLUSIONS

improvements in MO technology (split optics and lighter optical heads); as well as drive and robotic technology improvements (more pickers, and more efficient cartridge accessing and handling algorithms).

For example, HP's SureStore 80st jukebox products (introduced in February 1995) use a dual-disk transport system (the robotic arm has two disk pickers) that performs disk exchanges while the drive itself spins up and down simultaneously. With a six second disk exchange time, "it's 40 percent faster than HP's previous jukebox products," says Pam Keeling, HP's optical jukebox product manager. By comparison, Plasmon (Milpitas, Calif.), an HP competitor, is advertising their RF20J-690 optical disk jukebox using direct-drive robotics (versus belt-driven) with an average disk exchange time of two to four seconds. "A jukebox can have the fastest drive in the world, but still provide unacceptable performance if the robotics aren't as fast as well," says Phil Storey, Plasmon's president.

## A LITTLE BIT LOWER NOW

ALTHOUGH THE prices of optical disk drives have dropped about only 10 percent in the last year, optical jukeboxes significantly bring the cost per megabyte down. For example, after the initial expense of a multifunction drive, you can purchase 650 MB optical disks for a street price of \$80 and 1.3 GB

optical disks for about \$100. That's compared to last year's cost of \$104 and \$130, respectively. In 1995, the suggested retail pricing fell about 20 percent for all media (650 MB, 1.3 GB and 2 GB).

Higher capacity. Higher performance. Lower cost. All that and a bag of software tricks is the ongoing story in the optical storage market.

## JUKEBOX HEROES

AN OPTICAL drive or a jukebox won't do you much good — without software. Unfortunately, that's where many optical drive vendors, including HP, have left users in optical confusion. IT managers have been slow to understand that the native file systems of most OSes in use today typically favor magnetic media and haven't easily supported optical technology. Consequently, although optical drives have come to use a common, standard SCSI-2 connection, different (read non-standard) software drivers are required to hook up each optical drive. At multivendor sites with different operating systems, the situation was difficult at best.

But not anymore. Optical drive manufacturers have gotten smarter, and so have their products. "Optical drive manufacturers were foolish for making it so difficult," says Michael Peterson, president of Strategic Networks (formerly Peripheral Strategies; Santa Barbara, Calif.). Consequently, optical



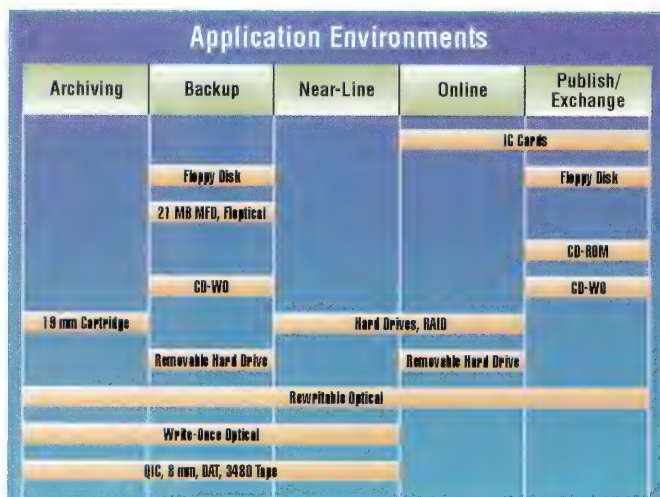
Using HP's 20XT, 40T, 120T and 200T optical jukeboxes, Ten X Technology's Oneserver provides 20 GB to 188 GB of storage.

drive manufacturers have been introducing so-called "direct connect" optical drives. "Direct connect lets an optical jukebox be hooked up anywhere on the LAN as a peripheral," explains Peterson. "Performance is about the same. And it's independent of the operating system. What could be simpler than a network appliance?"

HP's answer is their new direct connect HP SureStore LAN jukeboxes (40st, 80st and 100st) which provide an integrated controller as well as a 1.72 GB magnetic disk drive for caching data. HP's low-end jukebox — the 20xt — uses a 340 MB disk drive. With the direct connect configuration, the jukebox can be hooked up to an Ethernet-based network with clients using NFS or NetWare's IPX/SPX protocols. Similarly, Andataco (San Diego, Calif.) offers the Ensemble Optical Disk File Server (Ensemble/OFS) which does not use software drivers. Any UNIX or NetWare client sees the Ensemble/OSF as a network storage device.

Another answer is the Ten X Technology (Austin, Texas) ONEserver. The ONEserver is a combination of HP's OEM jukeboxes (20XT, 40T, 120T and 200T) and Ten X's Network Jukebox Interface (Net-JBI). Net-JBI literally "black boxes" the entire solution by using a separate controller (located inside a black box) that sits between the jukebox and the network. With a 1 GB hard disk cache (which is upgradeable), "you can let

Rewritable optical storage is the only medium versatile enough to span the spectrum of application environments.



Source: Optical Storage Technology Association (OSTA)



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CIRCLE 143 ON READER CARD



## OPTICAL CONCLUSIONS

files age in the cache," says Greg Wise, marketing manager for Ten X.

Similar black box or intelligent controller solutions are available via the MasterMind Networked Attached Peripheral (NAP) from QStar Technologies Inc. (Rockville, Md.), and Spanserver from Symmetrical Technologies (Herndon, Va.). Both QStar's NAP and Symmetrical's Spanserver work with Novell and UNIX (including HP-UX) platforms. However, QStar's NAP also works with Macintosh and MS-DOS/Windows platforms.

Once on the network, however, there are two ways to work with your optical disk drives: as one big hard disk (a single large volume); or as a so-called disk farm (where each side of an optical platter can be designated as an individual file system). For example, HP resells the Archival Management And Storage System (AMASS), a software product from EMASS (Englewood, Colo.) that allows the platters in one optical jukebox to be seen as one logical volume. And QStar's MasterMind Axxess allows optical disks to appear as mounted magnetic disk drives.

For Novell NetWare LANs, SCSI Express from MicroDesign International (Winter Park, Fla.) uses the native NetWare file system so that optical devices mount as NetWare volumes, which then appear to users as hard disks. Besides NetWare 4.x, SCSI Express works with HP-UX, IBM AIX, Sun Solaris, MS-DOS, Macintosh and IBM OS/2 Warp operating systems. The OptiDriver System 2000 and OptiDriver from OptiSys Inc. (Glendale, Ariz.) also supports NetWare networks as well as 3Com's LAN Manager, LANtastic's LANtastic, Banyan Vines and Microsoft's Windows for Workgroups. OptiDriver lets an optical device look like another available MS-DOS (or SCO UNIX) drive. With the addition of a dedicated server, OptiDriver Net optimizes network performance.

Optical drives and the appropriate software goes a long way to solving a problem of gothic proportions: proliferating electronic versions of paper documents, graphic images, daily

work files and, sooner than you think, full-motion video all need to be stored somewhere. Somehow.

### A JUKEBOX WITHOUT A CLUE

FOR USERS, storage management falls into two categories: those who want to and those who don't. The previously mentioned one big disk configuration or disk farms are for those who *do* want to manage their own storage. HSM, then, is for those who don't mind if their data moves around a network automatically.

Unfortunately, HSM is one of the most misunderstood concepts in the optical storage market today. "There's a lot of confusion out there," says Strategic Networks' Peterson. Discussions of HSM always focus on the data repository observes Peterson. "Everyone always asks, 'Can I get my data back?' But it's entirely the wrong question."

According to Peterson's estimates, less than 2 percent of a user's working files are never looked at again. That means users need most of their data (98 percent), most of the time. So the real value of HSM is in reducing disk drive

### CD-ROM: LIVIN' LARGE

Monterrey Bay Aquarium, a Pacific Coast marine research institution is collecting thousands of hours of digital video footage of undersea life. It will be used as part of an online interactive video database for research purposes. A perfect use for rewritable optical storage? Guess again. The digital images will be save on CD-ROMs and will be placed into a CD-ROM jukebox. The system is being implemented using HP 9000 workstations, digital video capture boards, a CD-R system and a NetworkCD CD-ROM jukebox system provided by Concorde Technologies (San Diego, Calif.)

Surprised? Many users have perceived the cost and complexity of an MO jukebox, MO media and its required driver software as being too high relative to faster and easier to understand magnetic hard disks. But don't overlook CD-ROM, which now offers a number of advantages over MO.

**Standards:** While the MO industry is still working on finalizing a standardized file system, CD enjoys the benefits of the ISO-9660 file system standard. The ISO-9660 standard, along with the High-Sierra and Rock Ridge Extensions, allow a single CD to be readable on PCs, Macintoshes, UNIX and most other computer systems. The lack of MO standardization results in optical cartridges created on a specific platform being readable only by a computer of that same platform.

**Recordable CD:** A new technology, called CD-R, allows users to record their own CD-ROMs in-house at a very reasonable cost. This makes CD a competitive alternative to MO for online archival applications. The expected 100-year shelf life of CD-ROM makes it a desirable alternative to tape for many applications as well.

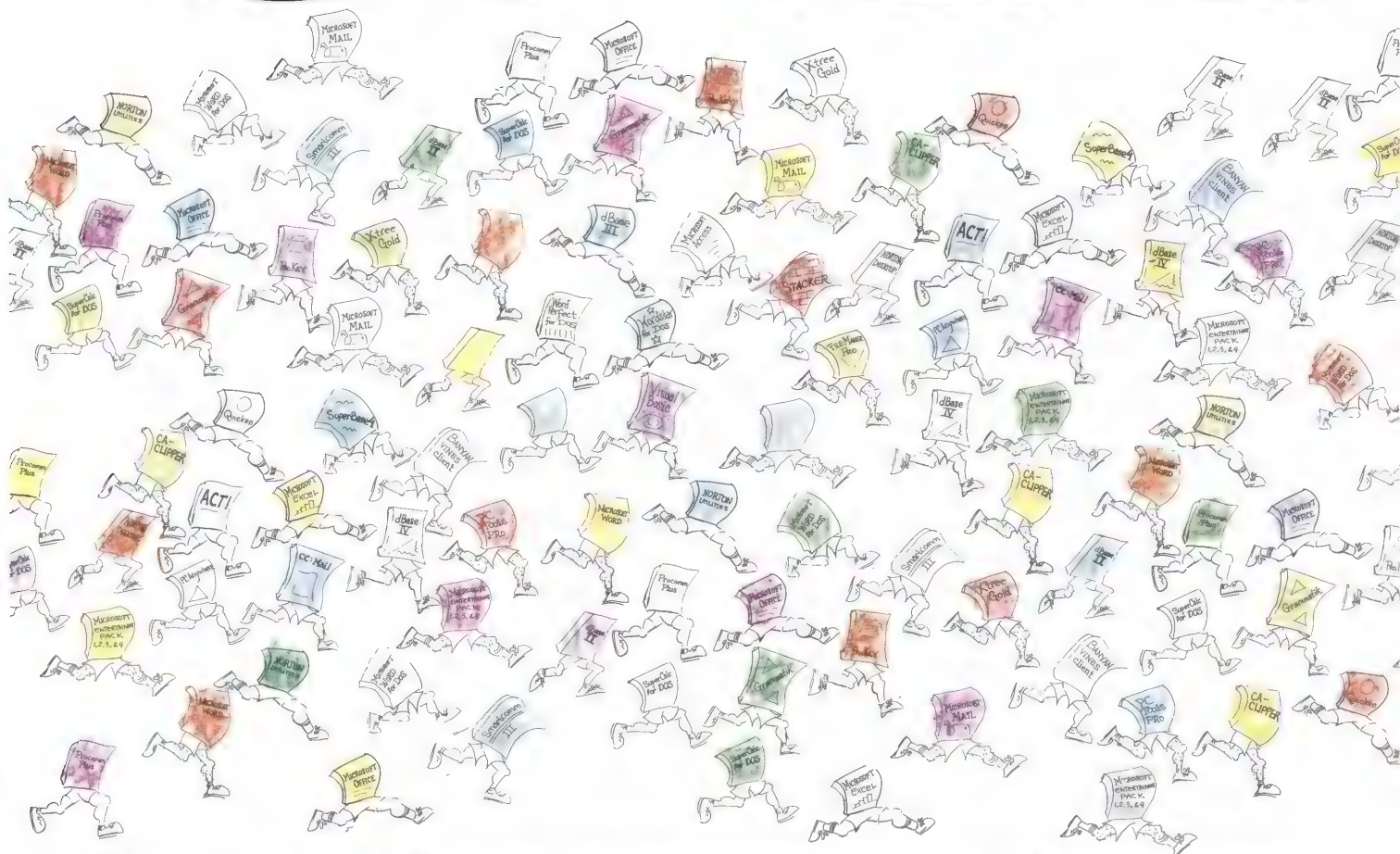
**Media Cost:** MO cartridges can store 1.3 GB of data for an approximate cost of \$130 each, or about 10 cents per megabyte. CD media can store approximately 650 MB of data at an approximate cost of \$13 each, or two cents per megabyte. For a 200 GB near-line application, the media cost of CD is \$4,000 versus over \$20,000 for MO.

**Drive Cost:** Recently, CD jukeboxes have been introduced that provide the same functionality as MO jukeboxes, but at approximately one-third the cost per megabyte of capacity. Standalone MO drives currently are approximately five to 10 times as expensive as CD-ROM player drives and twice as expensive as some CD-R recording drives.

**CD Media and Drive Usage:** Most platform manufacturers, including HP have announced their plan to use CD-ROM as their primary (and in some cases only) type of media for distribution of operating systems, application software and online documentation. This, in addition to the trend by software manufacturers to use CD-ROM as their primary media for distribution of their products, has resulted in computer users virtually all having CD-ROM drives in use. —*Jim Jenkins is the Optical Products manager for Concorde Technologies Inc. (San Diego, Calif.).*



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## OPTICAL CONCLUSIONS

growth and improving network performance through caching to magnetic disks. And because of the centralization that occurs, it also reduces the cost of system administration.

HP offers its own HSM software called HP OpenView OmniStorage that works with NFS-supported environments. The biggest advantage is that OmniStorage runs under HP OpenView, HP's network management product. HP also resells EMASS' DataMgr which sits on top of the previously mentioned AMASS product. QStar's MasterMind Enterprise Server and WorkGroup software provide HSM capabilities.

## STORAGE BY THE

1,000 MB = 1 Gigabyte (GB)

1,000 GB = 1 Terabyte (TB)

1,000 TB = 1 Pentabyte (PB)

1,000 PB = 1 Exabyte (EB)

NUMBERS

HP jukeboxes also are supported by a number of VARs and integrators who provide a number of HSM solutions for HP-UX and other UNIX platforms:

Traverse 2.1 from Artecon (Carlsbad, Calif.); METIOR from Automated Network Technologies (Lakewood, Colo.); Dorospace from Dorotech (Oxon, United Kingdom); and NetStor from NetStor (Burnsville, Minn.). Cheyenne Software Inc.'s (Roslyn Heights, N.Y.) Cheyenne Optical Storage Manager for OS/2 supports HSM on OS/2, and Palindrome Corp.'s (Naperville, Ill.) Hierarchical Storage Management software supports OS/2 as well as Windows and Novell platforms. Windows NT is supported by U.S. Design's (Columbia, Md.) Optical SuperStor.

Besides its familiar uses in backup/archival as well as document and image management applications, optical storage is already being mined for future applications. By the year 2000, according to Linda Kempster of the IIT Research Institute (Lanham, Md.), downloaded satellite data from space stations may produce 80 TB per year. After 2000, she predicts data may be produced at a rate of 3,650 TB per year. And you thought you had storage problems. But there are more terrestrial reasons to draw an optical conclusion.

Like "remote vaulting," for instance. Remote vaulting, an increasingly important part of disaster recovery operations, is a substantial growth industry. "About \$800 million a year," estimates Peterson. He cites telephone companies like New Zealand Teleco as primary candidates for optical storage.

Likewise, HP's Keelings says, optical storage for archiving and backup is preferred over tape for disaster recovery operations. There's no sequential reads as with tape," she explains. "You can store the disks off-site and restore your data quickly." To which Peterson adds: "Most of the disk recordable data in the world is at home in someone's underwear drawer."

Keeling also sees an increase in demand for optical storage in workflow application and for Computer Output to Laser Disk (COLD) applications in particular. According to IIT's Kempster, a typical ASCII or COLD page requires 2 KB of storage. By comparison, an average document

## SEEING EYE TO OPTICAL

Dealing with optical technology is hard enough. But dealing with optical acronyms and meanings can be a challenge too. Below we offer some definitions that can help you see the light.

**CD-ROM** — An adaptation of CD audio technology for data storage. CD-ROMs contain up to 650 MB of data and are usually used for publishing software, databases and directories.

**COMPUTER OUTPUT TO LASER DISK (COLD)** — COLD is a software system that receives data reports from mainframes and other computers, and indexes and stores the data on optical disks. COLD replaces or complements microfiche.

**DIRECT CONNECT** — Direct connect refers to software drivers that enable an optical disk drive to be connected in plug-and-play fashion to a workstation or server, and function like a hard disk drive.

**HIERARCHICAL STORAGE MANAGEMENT (HSM)** — Also known as Automatic File Migration, HSM is an intelligent file management system that moves or migrates each file to a less expensive medium (RAM, magnetic disk, tape, offline shelf or vault). Files may be prioritized and migrated by user-controlled "high or low water marks" such as frequency of use, last update or file size. HSM software stores and reads files from the hard disk. But unlike the one big disk approach, HSM manages the migration to and from each level of storage.

**ISO/IEC 13346** — New file system standard jointly developed through ANSI, ECMA and ISO. Commonly referred to as the "NSR" standard because it was designed for non-sequential recording. NSR is intended to encompass all possible file systems. By providing the ability to write, as well as read, information among different OSes, NSR is different from ISO-9660 standard, which was created as a read-only file system.

**MULTIFUNCTION DISK DRIVE** — A disk drive capable of using write-once and rewritable media. Optical drives that are 5.25-inch combine both. Optical drives that are 3.5-inch combine a rewritable function with a read-only capability.

**ONE BIG (HARD) DISK (CACHE)** — With the appropriate software, an optical library can look like one big magnetic (hard) disk. A LARGE and SLOW magnetic disk. To minimize jukebox activity, indexing information is physically cached to a hard disk. The jukebox thus appears as a large partitionable file system. The software runs with native OS file system commands and transparently manages all jukebox robotics and file management chores.

**PITCH** — The distance between corresponding points on adjacent tracks.

*Source: HP and Optical Storage Technology Association (OSTA)*



# JUST HOW BIG IS A TERABYTE?

## One terabyte (TB) equals:

- 999,999,999,999 + 1
- 114 billion punched cards

1 TB of ASCII data on paper would consume 42,500 trees.

1 TB of ASCII data (at 12 cpi) would circle the earth 56 times, which is equivalent to 1.4 million miles.

Source: IIT Research Institute (Lanham, Md.)

image requires 50 KB of storage.

Until recently, magnetic disks and tapes, as well as 12-inch WORM drives, have been the digital media of choice. But Freeman Associates predicts that shipments of rewritable optical drives will balloon to 45 percent during 1995. According to Freeman, orders will increase not only for 5.25-inch media, but for 3.5-inch and 2.5-inch as well.

So increasing optical disk capacities is a medium made for serving the electronic masses of data and master-

pieces reappearing in a digital form. Less costly than magnetic disks with the same capabilities as tape, rewritable drives use removable media which are able to be updated or permanent. The 100-year shelf life of

optical storage make it safe for disk backup and secure for data transport and archiving.

It's no optical illusion; even though rewritable optical storage is not the cheapest kind, or only kind, of digital storage, its middle of the road position in the storage hierarchy makes it a more than reasonable choice for near-line access to increasing amounts of data reaching gothic proportions.

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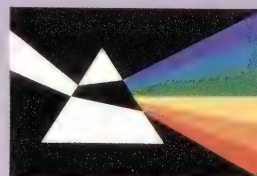
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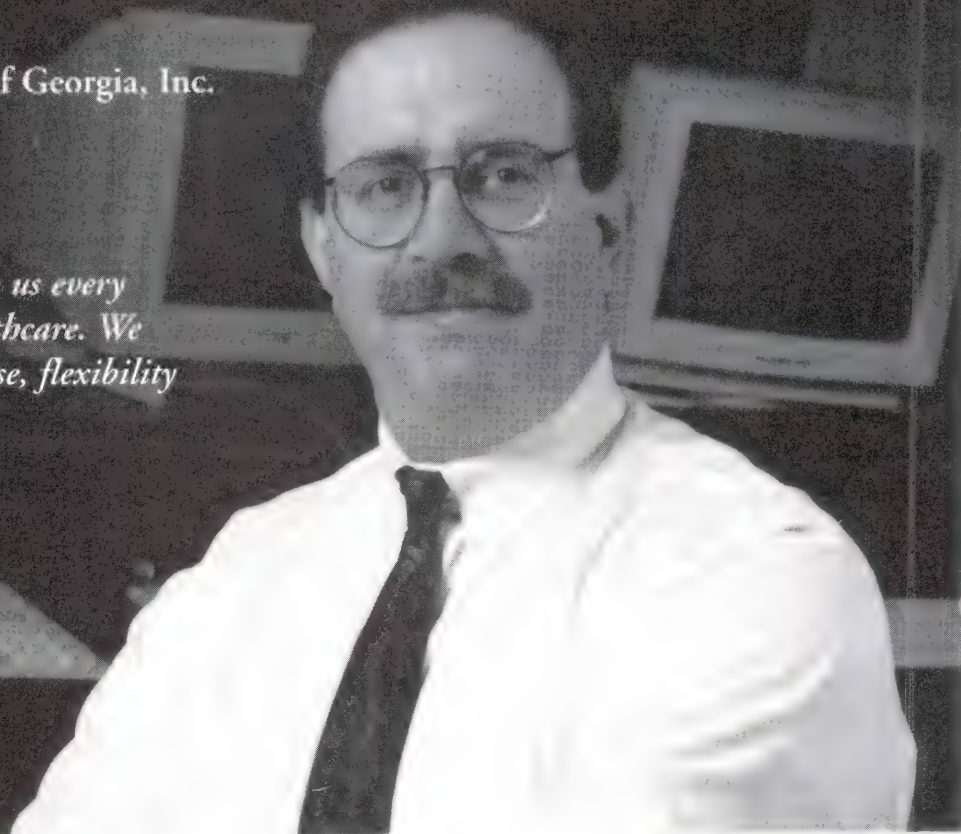


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# BREAK THE

# Shackles Of Choice

These days, simply "backing up" data is giving way to "storage management." The key characteristics of a storage management solution include:

- Automated operation.
- Special data security for distributed environments.
- Works within established company business policies.
- Easy to add new clients and servers to the system.
- Multivendor platforms ranging in size from PC to mainframe.
- Performance at the lowest possible cost.
- Easy for administrators to learn, install and operate.
- Operates in concert with other system management products.

Although, many storage management products on the market do backup, they have no integrated Hierarchical Storage Management (HSM) function; do not support an enterprise's business policies; and support only a

## *IBM Offers*

## *Storage Management*

## *Alternative*

small number of clients, servers, devices and communication protocols.

In 1993, 3M (St. Paul, Minn.), installed IBM ADSTAR Distributed Storage Manager (ADSM) to back up distributed clients to its IBM mainframe. 3M found that ADSM provided a storage management solution for its heterogeneous environment containing multivendor and multiplatform PCs, workstations and LAN file servers.

Over the past several years, IBM has expanded ADSM's support to over 20 clients and file servers, seven storage management servers and a large number of storage devices. In April of this year, IBM shipped server support for HP and Sun, and is developing a Windows NT server. ADSMs target customers, like 3M, with a hetero-

N o r a D e n z e l



## Shackles Of Choice

geneous computing environment. Gretchen Thiele, centralized technical services lead analyst at 3M, says non-IBM support adds another dimension to ADSM. 3M has recently added HP and Sun clients, and intends to have HP and Sun servers in future configurations.

"IBM has steadily added to the list

of clients and servers, and the various versions of the product all have the same 'look and feel.' That has allowed 3M to expand ADSM support to additional user groups without adding headcount. We can easily leverage past experience into new platforms," maintains Thiele.

ADSM caters to the kind of

contributed environment common with many businesses today, where centrally managed processes are needed to maintain adequate security levels and to reduce costs, but the data being managed is distributed and geographically dispersed.

For example, Florida Power and Light (FP&L) has a multivendor,

### HP 9000 VS. AS/400 STORAGE

Are you, like a growing number of AS/400 users, testing the HP 9000 waters. The AS/400 and HP 9000 storage markets differ not only in the number of available choices, but also in costs and technical requirements.

While the AS/400 storage market is dominated by a few large vendors, the HP 9000 storage market, as part of the open systems market, is characterized by a few large vendors, plus many smaller ones. Why? It is largely due to the technologies of each system, and the opportunities these technologies provide vendors for product development.

#### FEWER CHOICES, FEWER RISKS

The AS/400 is a proprietary platform tightly controlled by IBM. Although, IBM has made the AS/400 more "open" by adopting standard communication protocols, it has made other parts of the AS/400's architecture even more proprietary. For example, in May 1994, IBM introduced "internal DASD," moving disk controls once located on attachable subsystems to the inside of the AS/400. By doing so, IBM has limited storage vendors' opportunity to provide more innovative products.

In addition, tighter control by IBM means vendors' development costs are relatively high because they must build to strict manufacturer specifications. Consequently, there are just a handful of storage vendors in the market. Less variety and opportunity for innovation has resulted in reliable, highly-standardized storage devices. In fact, because these devices are closely integrated with the AS/400's operating system, OS/400, they are practically plug-and-play.

At the same time, limited competition and higher product development costs have resulted in higher prices. On average, prices for comparable storage devices are 25 to 50 cents more per megabyte in the AS/400 world than in the open systems market. In addition, limited competition and limited room to differentiate products means fewer storage innovations, for example, RAID (redundant array of inexpensive disks) technology. RAID — now available in almost all computer storage markets — was available about two years earlier for open systems than the AS/400.

#### MORE CHOICES, MORE RISK

Companies that once focused exclusively on the AS/400 storage market are now expanding their offerings to include the HP 9000 and other UNIX variants. For instance, in the AS/400 arena, there is 8mm, quarter-inch

cartridge (QIC), half-inch round and half-inch square options. In the UNIX market, there is 8mm, QIC, half-inch round and half-inch square, plus 4mm and digital linear tape (DLT). In the HP 9000 market, you'll also find more choices in disk array technology. RAID, virtually nonexistent today in the AS/400 market, is generally available in the HP 9000 market.

Because the AS/400 is popular for off-the-shelf applications like those for accounting and manufacturing, it is primarily a transaction-processing platform. Transaction processing, such as customer records, requires small blocks of data. Therefore, RAID 1 and RAID 5 provide the best performance.

The HP 9000, on the other hand, is a number-crunching platform, common in engineering and scientific arenas, with a heavy usage of imaging applications. For this type of environment, which requires the transfer of fewer but larger blocks of data, RAID 3 provides the highest performance.

In addition to technical differences between the AS/400 and HP 9000 storage markets, there also are price differences. The reasons are three-fold: First, more vendors means more competition. Second, the greater size of the open systems market allows vendors to spread out their R&D costs over more units. Third, vendors' product development costs are sometimes lower because some of the development is relegated to the users.

As many storage devices for the open systems market are engineered to run on multiple flavors of UNIX, you may be required to tweak your peripherals for a particular UNIX variant — HP-UX or others. You may even be required to write a device driver to enable the cache on your new disk subsystem. Such tweaking, in fact, is encouraged by UNIX vendors because it allows you to build systems that best meet your particular computing needs.

While this is a cost-cutting boom for users with the necessary UNIX talent and skills to configure the systems and peripherals, it's a bust for those comfortable with the plug-and-play AS/400 world. But look before you leap, smaller vendors may not have the stability and financial soundness to be a long-term storage provider. — *E. Robert Kleckner is a senior consultant for StorageTek Distributed Systems Division Inc. (Lisle, Ill.) a provider of storage products for the AS/400, UNIX and PC markets.*



multiplatform system that backs up data to a central location in Miami and then sends it via T3 lines to an automated tape library 110 miles away. According to Ed Gambon, technical support supervisor at FP&L, "Given the strong possibility of hurricanes and severe storms in South Florida, we feel we need to offer our users a sound environment for data recovery."

FP&L's mainframe system does daily backups for a variety of distributed systems including Novell file servers; HP servers; and OS/2, Windows and Macintosh workstations. According to Mike Hedden, ADSM project leader at FP&L, almost 6 million files are currently being managed by ADSM, compared to about 160,000 mainframe datasets being managed by HSM.

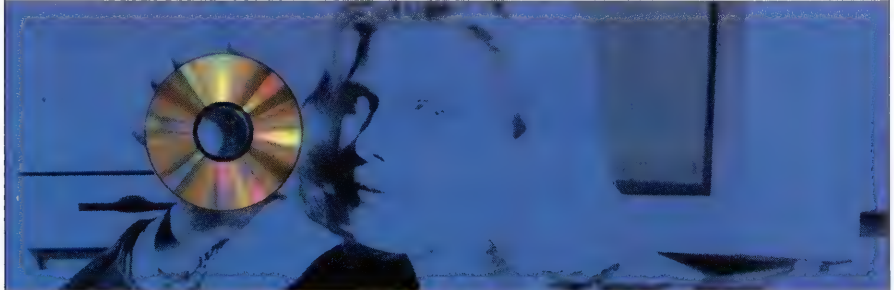
About 8 to 10 GB are incrementally backed up on a nightly basis with ADSM's automated scheduler. Gambon suggests that perhaps the most significant benefit of ADSM at FP&L is that the product has met the company's strict corporate data asset protection requirements. He adds that capitalizing on existing expertise and resources has been another key to FP&L's success.

Benefits of a product like ADSM include the fact that customers can implement a consistent storage management policy across the enterprise. Customers now have data protection and HSM function integrated into a single product. In addition, by using ADSM's API, businesses and application vendors can integrate storage management function into other applications.

In the future, businesses will be challenged by the problem of maintaining the right level of system performance and data availability, and at the same time containing costs. Therefore, storage needs to be an upfront concern rather than an afterthought.—*Nora Denzel is product manager for ADSTAR Distributed Storage Manager at IBM.*

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# No Time For

# Excuses

Nathan Thompson

**W**hen it comes to backup, you're probably familiar with the litany of excuses: Backing up only the essential data that changes, so that whole file systems have to be rebuilt from the OS in the event of failure, or backing up only part of an RDBMS database every night — until the disk runs out during the export. How about this one: some backup is better than none, right?

Just ask a systems administrator, "What are your backup procedures?" You're likely to get a grin and a story about outgrown shell scripts. Even at sites with sophisticated MIS departments, backing up seems to be an afterthought. Why? Because managing UNIX servers is proving to be difficult and costly. Mismanaging it, however, is usually more costly both in terms of dollars and data loss.

That's why early forays into automated tape libraries and sophisticated network backup software have paid big dividends for companies that have

installed them. Increased data protection and lowered labor costs have been the primary benefits. Of course, the most important issue is cost. Actually *cost savings* is the objective for backup automation — especially when it comes to recovering after a data loss. A recent study by Strategic Networks (Santa Barbara, Calif.) puts the price of recreating 20 MB of data (depending on the application) at \$15,000 to \$100,000.

Also, a new system that automates only some parts of the process but still requires a human operator will bring the cost of automation, but without the benefits. Another Strategic Networks survey puts the average management cost for automated backup and restore at \$30,660 — less than half the average \$64,097 for administering a year's manual backup and restore. Therefore, be certain that the products you select will completely automate the entire backup process.

After cost, performance is the next

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## Backup

most important factor to consider. New technologies like helical-scan and DLT drives have impressive throughput ratings. Still there are other problems: 10 DLT drives, which provide an aggregate 25 MBps transfer, connected to a slow server on a 10 Mbps Ethernet network are not going to back up hundreds of gigabytes per night. In fact, you'll be lucky to see 25 MB per minute.

Network topology is a key factor in planning a backup strategy, especially when it comes down to distributed vs. centralized backup, where politics and security enters the backup equation. A good backup solution will allow you to meet your requirements without forcing you to change procedures. Keep in mind, in a distributed backup scenario, network bandwidth is typically one of the largest bottlenecks.

Evaluating and optimizing network backup performance can be a herculean task. If you need a greater transfer rate — add a tape drive. If the server is too slow — replace it or add another SCSI controller. If the network is bogged down — go to subnets or install a fiber backbone or 100 Mbps Ethernet.

For example, for the past 15 years, backup has always been the highest



priority for Bruce Elliott of Ontario Hydro (Ontario, Canada), one of North America's largest electric utility companies. Elliott has seen the problems associated with the lack of necessary and sufficient backup procedures. In one experience, four years of work was jeopardized. So he wasted no time convincing Ontario Hydro's management that an automated backup solution was well worth the expense. Elliott installed a pilot installation of a Spectra Logic STL-6000 8mm tape library and Alexandria Backup Librarian software.

The first backup was from an HP 9000/755 workstation (used as a server). Other machines were to be backed up via NFS-mounting of their file systems, rather than using Alexandria's socket-based client software. This solution saved money on client licenses. The initial results were encouraging, but the client machines presented some problems. The RPC-based NFS transport did not provide

the performance required to make the backup window, and file permissions and pathname conflicts made restores to the NFS-mounted file systems difficult.

With an eye on the budget, Elliott installed client licenses on the larger machines. Now he backs up 27 Alexandria clients (26 HPs and a single Sun system) to a single Alexandria server. An HP 9000/712 server uses a Spectra Logic Spectra 4000 library to manage about 40 GB of data (includes the software for the server, all the clients and an Oracle RDBMS for financial and documentation support).

In addition to performance and restore security, the client software allows each client to launch and execute their own store operations. Because of the high turnover of users at the generating station, user-restorations have been disabled. All restores are still requested from system administrators. According to Elliott, the automated solution has lived up to its potential. "I

get E-mail if there is a problem and we run spot checks." These spot checks include using a test-restore to verify the integrity of the stored data on the clean hard disk of a newly purchased system before it is put online.

Does Elliott get more sleep? No, but Elliott is not resting on his backup laurels. New projects include hot (online) backup of their Oracle databases. Currently, the software shuts-down the databases, backs them up cold and restarts the database on completion. A personality module would allow this to be done online. But the front office has questioned the cost. And so it goes.—Nathan C. Thompson is chairman and founder of Western Automation (Boulder, Colo.), a manufacturer of storage products. Its Spectra Logic division develops and manufactures computer peripherals and UNIX backup software.

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# GENEROUS TO A FAULT

*HP's  
New  
Thought  
Process  
For  
RAID*

Information storage requirements continue to expand, fueled by two powerful forces. One is the rapid mainframe downsizing phenomenon. Applications that formerly resided on expensive, water-cooled mainframes are migrating to multiuser UNIX systems to take advantage of the better price/performance ratio these environments hold.

Along with the applications comes vast quantities of data, often measured in hundreds of gigabytes or even terabytes. This data used to be comfortably and securely stored in a mainframe "glass house," where armies of highly skilled operators performed systems management, backup and recovery. The hardware, processes and procedures used to manage it often were so efficient on the mainframe that the data storage was nearly invisible and safe — but costly.

The second growth driver is the advent of powerful multiprocessing Pentium PC servers running network operating systems such as Windows NT and Novell. These PC servers are no longer toys that can be shut down nightly like their client-based siblings. These high-performance machines run critical enterprise applications and store data essential to the corporation.


## DATA PROTECTION

COMPANIES COUNT DOWNTIME in terms of minutes — not days — per year, a measurement that has spurred the data keepers on to consider technologies that promise relatively new forms of data protection, such as Redundant Array of Inexpensive (or Independent) Disk (RAID) storage systems.

RAID offers data protection, but at a price. Regardless of the level of RAID selected, the user is always constrained by a series of trade-offs, namely cost, performance and data availability. Unfortunately, the technology available so far has not been able to keep pace with user requirements, and optimization has been all but impossible to achieve.

Ed Pavlinik





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To respond to RAID's shortcomings, bandages for RAID have been designed, for example large amounts of expensive cache to mask RAID deficiencies or redefining new and proprietary RAID levels, such as RAID-S, RAID-7, RAID-10 and RAID-51.

### THEORY VERSUS REALITY

RAID TECHNOLOGY, and all its inherent benefits, was first described in a paper published in the late 1980s by scientists at the University of California, Berkeley. The theory was that data protection could be obtained with less overhead than with disk mirroring (or duplexing) by ganging together small form factor disks in groups whose data was protected by parity.

As anyone who has crafted a RAID system knows, use and management of traditional RAID systems have been complex, difficult and constrained by write performance. Traditional RAID

systems can take weeks just to install, let alone tune its performance and administer properly. Sheer volumes of information have been published just to describe RAID taxonomy, and special complex forms or logs have been created to map out slot placement, SCSI ID and RAID level for each disk. Extensive training for RAID installation, operation and maintenance is absolutely imperative with traditional array subsystems.

In an ideal world, system administrators envision: high data availability with no loss data access.; disk I/O that adapts to system reconfigurations; a disk system that is easy to use, manage and administer; investment protection; and the ability to add storage capacity to a disk system without downtime.

### REDEFINING RAID

HP INTRODUCED a third-generation information storage technology,

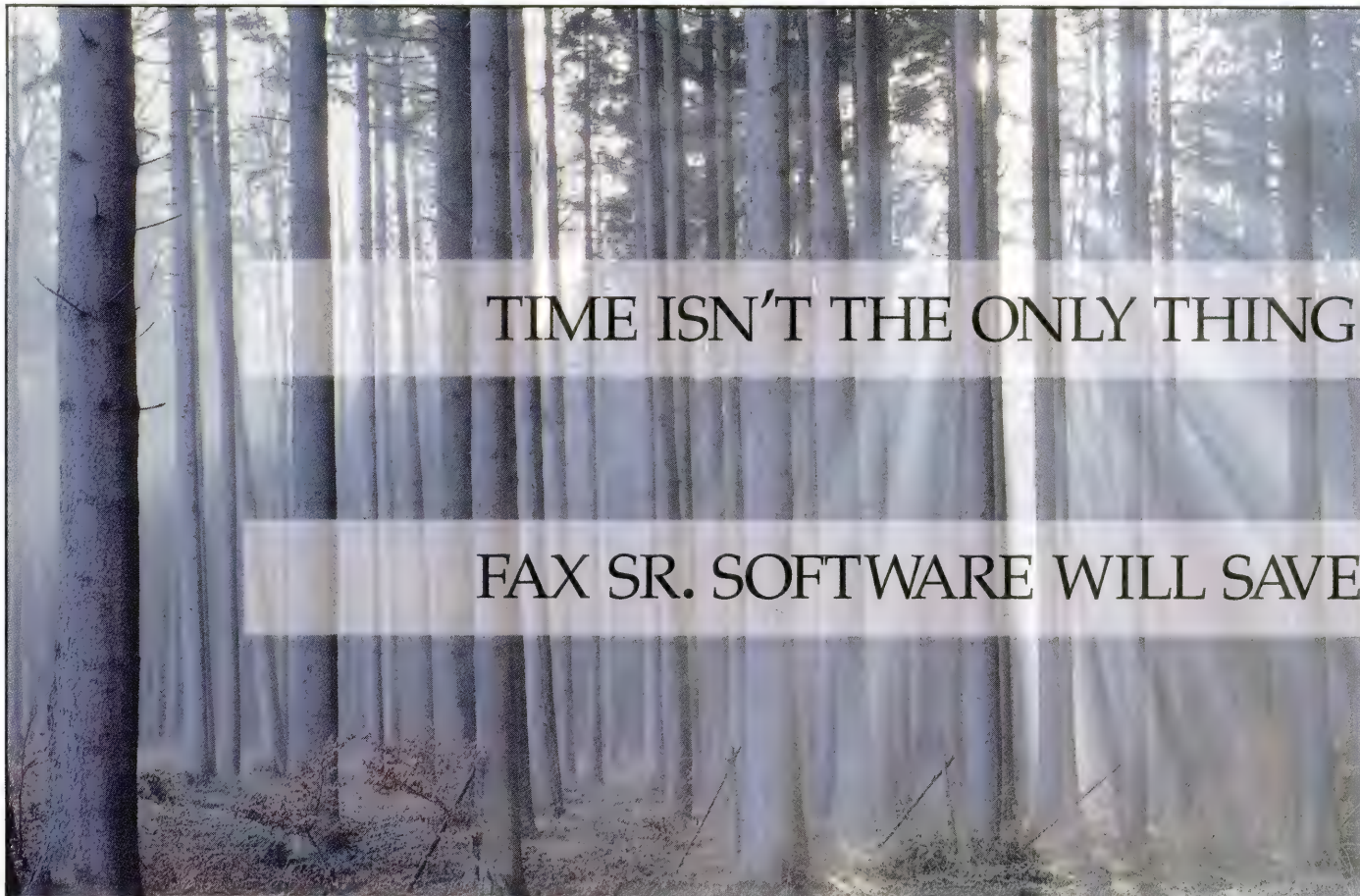
HP AutoRAID, which has dynamic data migration, automatic configuration and active hot spare capability.

The new definition of fault-tolerant storage means administrators do not have to select or even understand RAID levels. Dynamic data migration means that the system continuously, and without operator intervention, optimizes the system.

HP's AutoRAID technology functions as a three-stage hierarchical storage management (HSM) system. Data is written in from the host into a cache, then it migrates in blocks to load-balanced mirrored storage. When more capacity is needed, the data further migrates to a RAID 5 logical space without operator intervention.

A typical reason to reconfigure is to add more storage space to a subsystem. With traditional RAID technology, the system administrator has two options. The first is to add enough disks to create a completely new

*(continued on page 43)*





## CONTROLLED CHAOS

As companies embrace the concept of distributed processing to increase productivity, they often find themselves dealing with storage management issues that are critical to the successful implementation of this strategy. These issues include:

**Fragmented Storage Management** - As multiple storage technologies and levels of protection are implemented throughout the organization, IS managers are finding it increasingly difficult to manage the storage resource as a global entity. For example, when HP 9000s coexist with IBM AS/400s in the same organization, each platform has its own disk drives with their own unique characteristics, making storage standardization difficult, if not impossible.

**Management of Legacy Systems Data Migration** - As information is transferred from mainframe legacy systems to independent decentralized systems, IS managers find it hard to provide the level of service (data availability and protection) traditionally associated with centralized systems. This challenge might be more complex when multiple HP 9000 systems are used to offload information traditionally stored on a single mainframe.

**Protecting Mission- and Business-Critical Data** - As critical data is dispersed onto different host platforms throughout the organization, IS

managers need to devise data protection schemes that provide the level of availability previously associated with centralized legacy systems environments. Achieving this goal in a decentralized environment requires a shrewd assessment of the organization's needs. For example, should a single protection scheme be implemented across all new HP 9000 platforms, or should protection be determined on a CPU-by-CPU basis?

**Keeping Pace with New Technologies** - As the pace of new product introductions increases, companies are finding it harder to define a storage strategy for the long term. IS managers must find ways to take advantage of the latest technologies in the context of a long-term business plan, without incurring staggering costs. For example, whether an organization is adding new HP processors or upgrading its existing HP line, it will want the option to continue using existing storage peripherals to minimize new hardware costs and maximize return on investment.

**Achieving Cost-Effective Protection and Performance** - Traditionally, it has been cost-prohibitive to implement uniform data protection while still maintaining high performance. Increased capacities and the number of users are creating higher workloads for CPUs and storage subsystems. Traditionally, IS managers have turned to CPU or memory upgrades as the

(continued on next page)

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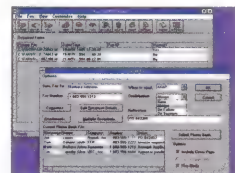
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WE COULD GO ON regarding the advantages of Quest Software's NetBase. For now, though, let's dis-

cuss the results of the cooperative efforts of David Doyle (of Quest Software) and Alfredo Rego (of Adager Corporation). The 1995 versions of their products, NetBase and Adager, communicate in such a way that NetBase captures and replicates Adager changes that you apply to your master databases. NetBase now shadows Adager changes, just as it shadows your regular database transactions. (This also applies to HP's OEM version of NetBase, known as SharePlex.)

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## GENEROUS

redundancy group. The second is to back up all the data to another device, add the new disks, reconfigure the entire subsystem and finally, restore the data. If few disks are being added, the first method is not cost effective, as it consumes the full capacity of one of the largest new disks for redundancy information. The second method is time consuming and requires the subsystem to be taken offline.

AutoRAID, however, allows the administrator to plug in new disk drives of any capacity, in any slot and in any order, and build a virtual disk. This process is done online. When a new disk is installed, AutoRAID load-balances the data.

One of the configuration tasks of the administrator is to create virtual disks from the physical storage space available. In traditional arrays, the administrator must understand the characteristics of each of the physical disk drives to group the drives, or sections of the drives, together manually to build a disk.

AutoRAID informs the administrator of the space available on all the disk drives. The administrator then specifies how much of this available space is to be used by each virtual disk. The subsystem mapping policies then

group the disks together to guarantee the largest usable capacity and the best performance while assuring that the data is protected.

In traditional systems, a hot spare allows the controller to start the rebuild process; but it is a wasted disk just sitting there waiting for another to fail. AutoRAID allows the hot spare to be used to improve subsystem performance, providing not only an insurance policy for a disk failure, but also a performance boost. The innovation is in balancing the user data across all the disks in the subsystem, including the hot spare, and by reserving a portion of space on each disk for the reconstructed rebuild data.

The bottom line is that downsizing forces and the growth of PC LANs impose stringent new requirements on data storage. System downtime is unacceptable. Systems administrators want what has been promised for nearly a decade: true fault tolerance with the best price/performance ratio without having to think about it. — *Ed Pavlinik is HP AutoRAID Product Manager for HP's Storage Systems Division.*

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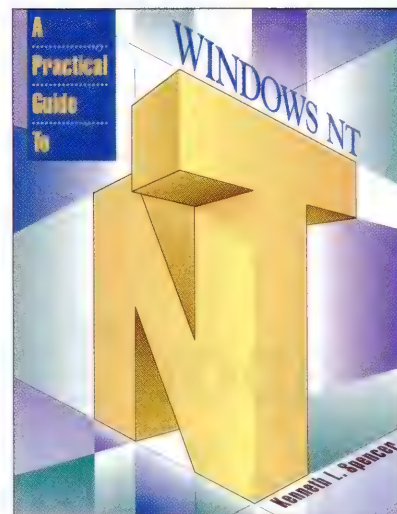
## CONTROLLED CHAOS CONTINUED

way to maximize performance in the face of corporate growth. However, this approach can result in high costs without the desired long-term performance gains. What other choices do IS managers have to improve overall system performance in a cost-effective manner?

Centrally-Managed Distributed Storage, which provides one storage platform that addresses the needs of multiple environments (high-end UNIX to low-end networks), is an alternative. For example, IPL's Centrally-Managed Distributed Storage strategy combines its hardware platform (the Enterprise Storage Series) with its management software tools (the Centralized Management System and IPL AutoAlert). These tools compliment several SNMP packages such as HP OpenView and IBM NetView and SystemView by giving users the ability to monitor storage status in addition to system status.

Centrally-Managed Distributed Storage offers simultaneous support for up to 16 independent hosts. Each controller has its own non-volatile mirrored cache with dual SCSI paths. Each RAID group can be configured with redundant power, customer-replaceable disks and dynamic sparing.

Centrally-Managed Distributed Storage Strategies allow distributed computing without relinquishing control needed to run the business. On the flip side, users continue to take advantage of performance benefits of distributed storage, with their link to IS resources intact; while standardizing on one storage vendor for service and upgrades.— *George Mele, vice president of marketing at IPL Systems Inc. (Maynard Mass.).*



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Jim Carr

# Vapor Trail On The High Speed LAN Track

**Experiencing LAN bandwidth shortages lately? Than you've probably already begun investigating**

the new technologies that promise to deliver 100 Mbps performance to the desktop. Are you confused by the choices? Or concerned about which high-speed technology best complements your LAN?

Then let me clear up one point before I continue: None of the new 100 Mbps-and-above technologies, including 100VG-AnyLAN, 100Base-T Fast Ethernet and Asynchronous Transfer Mode (ATM), is ready for full-scale workgroup deployment.

Wise network managers should begin evaluating 100Base-T Fast Ethernet or 100VG-AnyLAN products, which are positioned as the first step in the migration to ATM. For ATM, a firm "wait and see" attitude is appropriate. Delay 12 to 18 months before experimenting with it.

After several weeks of interviewing VARs and vendors about high-speed desktop connectivity, one thing is evident: There's a lot of "vapor" out there, none of the emerging standards are final. And interoperability testing is a mere fantasy.

In February, the Fast Ethernet Alliance and the 100VG-AnyLAN

Forum forwarded their draft standards to sponsor ballot, the last step before final approval by the IEEE Standards Board. The sponsor ballot should be completed by the time this column is published. Final approval of the standard (at the IEEE plenary meeting this month) should be happening as you read this, with an interoperability test suite due by the end of this year.

Moreover, VARs have limited, if any, familiarity with high-speed networks. Some are leaning toward 100Base-T, some toward 100VG-AnyLAN, but only a few have decided which draft specification to support. So, what's happening on the high-speed LAN front? Here's a look at the status of 100VG-AnyLAN and 100Base-T. I'll save ATM for a future column.

## THE NEXT 10BASE-T?

Brice Clark, strategic planning manager at HP's Roseville Network Products Division, says that in terms of popularity, HP hopes to make 100VGAnyLAN "the next 10Base-T." Unfortunately for HP, that would be a major upset. "HP has a marketing challenge ahead," agrees Marty Palka, the principal networking analyst at Dataquest (San Jose, Calif.). He feels HP deserves kudos for excellence with 100VG-AnyLAN. But, he thinks 100VGAnyLAN "could become like Arcnet — a very good technology. But long term, it gets squeezed out by other technologies."



When first announced in 1993, HP positioned 100VG-AnyLAN as a "fast Ethernet," and petitioned the IEEE to include it in the 802.3 standards. After some contention from 100Base-T proponents, it was granted its own IEEE working group number — 802.12.

100VG-AnyLAN uses a demand-priority access method that works with four- and two-pair cabling systems. In four-pair copper wire plants, 100VG-AnyLAN uses a quartet coding scheme that splits the data being transmitted into four parallel streams. Here, quartet coding sends data at 100 Mbps while keeping the signal frequencies in each wire pair at no more than 15 MHz, below FCC EMI limits.

With two-pair copper plants, 100VGAnyLAN splits data into two streams. The two-wire scheme operates at a higher frequency, taking advantage of shielded twisted-pair's (STP) shielding. 100VG-AnyLAN also supports dual-strand fiber-optic media.

100VG-AnyLAN has the benefit of transporting Ethernet and Token Ring frames. In addition, 100VG-AnyLAN guarantees bandwidth to specific applications regardless of traffic on the network, a key requirement for running multimedia over a LAN. On the other hand, because its principal scheme uses four pairs of unshielded twisted pair (UTP), 100VG-AnyLAN may require new cabling in many installations.

With all the "intelligence" and network control functions centered in the hubs, 100VG-AnyLAN hub prices will be higher (\$400 to \$500 per port) than similar Fast Ethernet configurations.

### ETHERNET — ONLY FASTER!

"Ethernet, only faster — 10 times faster!" That's the 100Base-T marketing cry for Fast Ethernet Alliance members, because 100Base-T essentially speeds standard 10 Mbps 10Base-T to 100 Mbps.

Its proponents, including 3Com Corp. (Santa Clara, Calif.) and Grand Junction Networks Inc. (Fremont, Calif.) claim 100Base-T offers a cost-effective migration to 100 Mbps by preserving Ethernet's Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method and making use of existing cabling.

The 100Base-T standard (802.3u in IEEE parlance), actually encompasses three draft specifications: 100Base-TX, for two-pair Category 5 UTP and Type 1 STP; 100Base-FX, for two-pair fiber-optic cable; and 100Base-T4, for four-pair Category 3, 4 and 5 UTP.

By midsummer, expect to see vendors shipping a variety of 100Base-T switches and network adapter cards supporting 10 Mbps and 100 Mbps via 100Base-T's "auto-negotiation" capability. Auto-negotiation allows a network device to sense the receiving

end's data-rate capabilities and automatically adjust its rate appropriately.

The auto-negotiation capability also means network managers can buy 10/100 Mbps cards for use with existing 10 Mbps Ethernets, but wait until the standards are final before adding 100Base-T hubs to their LANs.

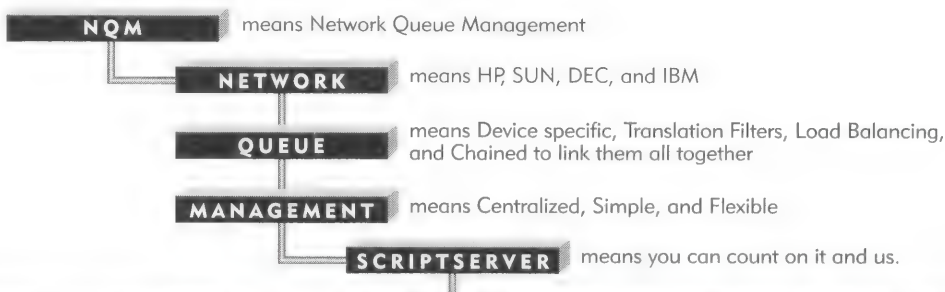
As of this writing, only a few Fast Ethernet vendors, most notably Grand Junction, were actually shipping product. In fact, at January's NetWorld+Interop show, only four of the seven vendors taking part in an interoperability demo had products available. Quite a few more showed products at NetWorld+Interop in March, however, with Asante Technologies (San Jose); Network (Dallas, Texas) and SMC (Hauppauge, N.Y.), announcing 100Base-T hubs or NICs.

Prices for Fast Ethernet adapters are expected to remain in the \$200 to \$300 range, with hubs costing about \$250 per-port. Most industry analysts say that because of the economies of scale and the presence of major NIC vendors such as 3Com and Asante, Fast Ethernet prices are expected to drop faster than those of competing 100VG-AnyLAN products. And that may be the biggest blow to 100VG-AnyLAN's chances of success in this high-speed market.

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Fred Mallett

# Dweeb Talkin' And That Ain't No Jive

**I was off to paint the ceiling of a cathedral with radical murals. But I found out that a guy named**

Mike already beat me to it. This article is another thing that someone beat me to. But hey, I'll just plagiarize them. Actually I'll be plagiarizing myself because many of the ideas here came from a Power UNIX course I just helped to develop.

Now, the first thing is to tell you what Power UNIX means. Does that mean it can't be done on a notebook running on a battery? Hardly. That's one of the most important times to be a power user (especially before the battery dies). There are better things to do on a plane than sit there with both hands busy typing repetitive UNIX commands into your laptop, especially if you are in first class.

Therefore, Power UNIX is typing in one command where you could have used two. Or 20. Or 200. You know, those things you see someone type that have lots of `":;~&$%^+|\` characters in them. You can usually hear a kind of non-committal grunt from me when someone leans over my shoulder and fires off something that will do what I was gonna do — only it takes about 2 percent of the keystrokes.

I always hope they will take the

grunt to mean "Well, that's OK, but what I was about to type would have been quicker, and more efficient." Somehow it never works. But it all starts the first time you discover you can enter `cd;ls` as one command. Sadly, for many people, it stops there.

At first it is easier to execute commands step by step, because it takes more time to make a tricky command work than it does to perform the steps in sequence. Still, with a little practice, it gets easier to rip off a nested `for` loop using piped input with in-line data fed by command substitution. My blood is really flowing now (how about yours?) Good!

## ECHO, ECHO, ECHO

The best place to start is with a reminder: all is not lost if an incantation does not work. Remember, you can use C shell history as input to an `echo` command, and save the attempt into a file (`echo "!!" > new_script`) then edit it; and try again. In the Korn shell, learn command line editing.

Also learn to use `echo` to make sure the shell will parse things as you want them to be. This means using the `echo` command, and the `echo` debugging function of the shell. Below is an example of using `echo` to test a command:

```
$ echo cp 4* ~/dat*
cp 4file.c 4file.o /user/fredm/dat*
```



Oops, good thing I didn't execute it. A bad filename would have been created. Let's try again:

```
$ echo cp 4* ~/day*
cp 4file.c 4file.o /users/fredm/dayforms
```

That looks better. Now, to execute it without retyping or grabbing the mouse. In the C shell use:

```
#!!*
```

In the Korn shell use:

```
r echo=
```

Using the shells' **echo** feature is handy to debug why a command does not work. In the C shell, use **set echo**; In the Korn shell, use **set -o echo** to enable the feature. Here is an example of when it is handy:

```
$ man ls | grep '-s'
```

Seems like a reasonable thing to do. I want to know what the **-s** option means to **ls**, so I use **grep** to look for the **-s** lines. Wrong. That results in a **grep** usage error message. So try the **echo** feature of the shells to see what it executed. The **echo** feature of the shells prints what it will execute (after-metacharacter expansion):

```
% man ls | grep '-s'
man ls
grep -s
```

From this we can see that the shell stripped the quotes from the **s**, and passed it to **grep**. **grep** took it as the **-s** option, so there was no pattern to look for. That means we must escape the **-s** twice, once from the shell and once from the **grep** command, so it uses the **-s** as the pattern not as an option:

```
% man ls | grep \-s
or: % man ls | grep '\-s'
or: % man ls | grep -e -s
```

The three examples above would all work. The first two with double escapes, the last using an option to **grep** that means the next string is the pattern. The **echo** feature shows this as:

```
% man ls | grep \-s
man ls
grep \-s
```

## DOWN TO BUSINESS

Now that we know that the **echo**

command (both of them) is helpful in figuring out what went wrong when a command does not work correctly, let's look at a few examples of commands that do work (if you type them in correctly).

A simple one is using a **for** loop on the command line. Use it whenever you want to issue a command once for each of many files. The syntax is simple, and easy to remember (C shell shown):

```
foreach var (list_here )
use $var here
end
```

# Power UNIX

## is typing in one command where you could have used two. Or 20. Or 200.

```
% cd /usr/tmp
% foreach user ( `ls -l|awk\
'(print $3)'\|sort|uniq` )
?mail $user <</
?Delete your files in /usr/tmp.
?/
?end
%
```

The example above used a command substitution of a pipeline of commands to develop a list of usernames with files in **/usr/tmp**. The commands that develop the list were spread over two lines to fit in the column, they can be entered that way, but you need the two escapes (**\**) for the shell not to choke on it. The **awk** was used to get just the username from the **ls**, and **uniq** removed duplicate names. The **mail**

command used n-line data (**<<**) to read input to mail sent to each user in the list (**\$user**) up until it read the first character after the **<<** again, alone on the line (**/**).

The **for** loop is easily overlooked as a command line tool. It should not be, as even the C shell lets us input the commands over multiple lines without escaping the returns. Just change the list of what to act on, and the commands to perform what you want.

Aliases are under utilized. They can contain variables when you need an argument in several places. Consider an alias to create a shell script:

```
% alias ms '(set scr=!:1;\\
echo "#! /bin/ksh" > \\
$scr; chmod 755 $scr )'
```

The alias shown above could have been entered on one line, but again we double escaped the new lines (**\**) to spread it over more than one line. In this example, I needed the file name supplied to the alias when it is executed (**ms new\_script\_name**) inside the alias. This is easily accomplished with the **!:1** syntax. It means take the first argument from the command line of the alias, and place it here. The problem is you cannot use this more than once in an alias. The solution is easy: Use a subshell (the parenthesis), and assign a variable in the subshell. All later commands in the subshell can then use the variable (in this case **\$scr**). Here is what the command looks like when executed with **echo** turned on:

```
% set echo
% ms poopsie
set scr=poopsie
echo #! /bin/ksh
chmod 755 poopsie
%
```

Darn. I was getting excited. I have more examples. But my EDITOR alarm just went off with status of **verbose**. That means I have to wrap it up for this column. Now, I'm going to go read a UNIX book.

Do let me know if you want more of this kind of dweeb talkin'.

*Mallett's Internet address:*  
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Gordon McLachlan

# A Look At SGML

**“Hell, if someone would be kind enough to invent the technology, I’ll be pleased to beam it directly**

into your cortex. We’ll have the city edition, the late city edition and the mind-meld edition.”

That was the publisher of the *New York Times* commenting about the electronic distribution of newspapers. Well, there is no mind-meld standard — yet. But, there is one for less cerebral forms of electronic publishing. It’s called the Standard Generalized Markup Language (SGML). As codified in the ISO 8879 specification, SGML is an open, vendor-neutral format for sharing electronic documents.

## THE DEFINING MOMENT

The SGML standard provides ways to define the structure of a document, the

character set used, text that is used in a document more than once and externally produced information to be included in the document. Think of an SGML-coded document as a container for information.

Each document contains a number of elements, which are organized in a hierarchy. There are three major parts in this hierarchy: the “document declaration,” the “document type definition” (DTD) and the “document instance.”

The declaration is a header containing information such as the character set and allowable characters that may be used, and the SGML options which are used in the document. The DTD maps out all the individual elements contained in the document. An element can contain printable text or graphics, a hypermedia object like a video or sound clip, or it may contain more subelements. The document instance is the collection of elements that make up the document you will see.

The idea of document types is important, because it allows documents of a known type to be processed by special-purpose parser programs.

## COME INTO MY WEB

Perhaps the best known types of SGML documents are World Wide Web (WWW) pages, which use a subset of SGML called Hypertext Markup Language (HTML). The fragment in

### FIGURE 1

```
<!SGML "ISO 8879:1986"> Standard SGML header
<HTML>HTML document DTD.
<HEAD><TITLE>Hypertext Markup Language example</TITLE></HEAD>
<BODY><H1>This is a level one heading</H1>
<P>This is a paragraph.
<H2> This is a level two heading</H2>
<P>This another paragraph.
<UL><LI>This is an indented line with a bullet.</UL>
<A HREF="link.htm" NAME="z1">This is a link to the file LINK.HTM</A>.
Click on the link to open the file.
</BODY>
</HTML>
```



*21 users need data.  
That means printing  
93,109 pages of reports,  
assembling and delivering  
them by 2 o'clock.*



**Or not.**

***Your problem.** You need to give your users fast, efficient access to data buried in corporate reports. But no matter how much paper, printing resources and time you spend, the life span of those reports keeps getting shorter, and your users constantly ask for better automation. It sounds like a losing battle, doesn't it?*

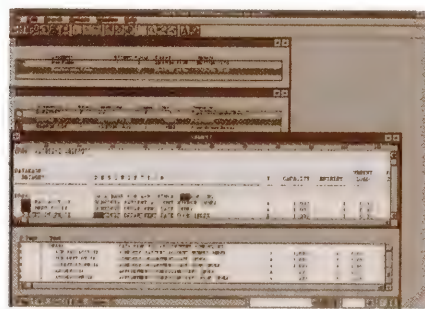
***Our solution.** VISTA Plus is the easy-to-use electronic report management solution that lets your end-users access reports, browse them, search for data and download it, even before they are printed. Full security, selective data distribution, annotation and ease of use make VISTA Plus the ideal report management solution.*

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## VISTA Plus

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THE DATA IS.  
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REPORT ON MY  
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## **SGML is concerned with defining the content and structure of data, rather than its presentation. SGML does not address formatting.**

Figure 1 shows a document written according to the HTML DTD. If you type it into a text file, you could open it and read it with your Web browser software, which is nothing more than a specialized SGML parser that recognizes HTML-type documents.

Don't confuse SGML with neutral word processor file formats. It's really quite different.

Most word processors have no data structure, per se, and content and presentation are all lumped together, with proprietary codes used to indicate fonts, underlining and other formatting information. In contrast, SGML is concerned with defining the content and structure of data, rather than its presentation. In fact, SGML does not address formatting, which is considered to be system-dependent.

Interpretation of the text within the body of the document (<BODY> ... </BODY>) is entirely up to the SGML parser, which is told what to expect by the DTD. When opened using my Windows browser, normal text is displayed using 12 pt Times New Roman, level one headings use 27 pt bold Times New Roman and the level two headings use 24 pt bold Times New Roman. The hypertext link is blue and underlined. Notice, however, that none of this is contained in the document itself. It's the job of the parser to take care of all the formatting.

Similarly, the hypertext links are also a function of the HTML parser. SGML doesn't pretend to know anything about hypertext links, but it can support it because it has the flexibility to let you define them within the DTD. Every type of document has an inherent structure you could exploit, if you define it properly. A business memo has

to and from fields, a subject heading, a date and a text body composed of a number of paragraphs.

A research paper has an author, title, body and bibliography. A document may have embedded graphs, spreadsheets or other documents. These structures can be defined fairly rigorously. And they can be used to set up DTDs for specialized parsers to use.

If you think of an SGML document as a collection of delimited data fields, you're not far off the mark. As well as signifying paragraphs and lines, you could use these fields to indicate different levels of security, E-mail distribution lists, addresses or other information. It isn't too hard to see how you could then link your documents with some sort of a database management system for more efficient storage and retrieval.

And that's where the power of SGML really lies. If all you need is a standard word processor format, you could store everything as Rich Text Format or WordPerfect documents. SGML gives you the power to really organize document-based information in ways never before possible.

Unfortunately, an enthusiasm for SGML has to be tempered by the reality that defining DTDs is not trivial and writing parsers isn't a consultant's job. Existing authoring tools for SGML are not exactly numerous or user friendly. And most of those that do exist are for UNIX platforms. That will change, however, as more word processing packages start to incorporate SGML tools. For example, Microsoft has announced an SGML add-on to Word that should be available by the time you read this.

McLachlan's Internet address:  
[mclachlan@cardinal.com](mailto:mclachlan@cardinal.com)

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data, you  
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hourly, buy a  
fire-proof safe,  
and a \$5 million  
insurance policy.*



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# **new** Products

## SOFTWARE

### **Intuit Announces Pocket Quicken For HP 100LX**

Intuit Inc. introduced Pocket Quicken, a mobile financial-tracking application for the HP 100LX Palmtop PC. Users can open Pocket Quicken to view a list of their transactions and account balances. The QuickFill feature supplies users with speed entry data. For example, once a transaction has been recorded, similar and future transactions can be completed with fewer keystrokes.

Pocket Quicken tracks and categorizes all spending, including checking, ATM transactions, credit cards and cash. This software can be used as a standalone personal finance manager with basic report capabilities or as a data-capture device that communicates with desktop versions of Quicken. Pocket Quicken for the HP 100LX will connect to Quicken for DOS or Quicken for Windows with the HP 200LX connectivity kit-F1021 "B," or F1021 "C" (includes Quicken connectivity).

Pocket Quicken is priced at \$69.95. The product is on disk and requires desktop connectivity to load onto the HP 100LX (Connectivity Pack F1021 "A," "B" or "C," or any other method of transferring files from a desktop computer to the HP 100LX).

Contact Intuit Inc., 64 Willow Place, P.O. Box 3014, Menlo Park, CA 94026; (800) 624-6930.

*Circle 400 on reader card*

### **VisionSoft Releases SpyGlass/iX**

VisionSoft announced SpyGlass/iX, a software tool that decreases software support costs and provides total control

over your HP 3000 users.

SpyGlass allows a user (the watcher) to view everything which is typed and displayed on another terminal. This feature allows the watcher to determine what a user is doing.

SpyGlass/iX allows a watcher to view an end user's terminal from their desk; and see their error messages, their screen, their input and eliminate the common problem of guessing what is on the users terminal screen. The product supports local terminal, dial-in users, remote users, virtual terminal sessions, character and VPLUS applications.

SpyGlass/iX is supported on HP 3000s running MPE/iX 4.0 or greater. Pricing starts at \$995.

Contact VisionSoft, 22032 Trailway, Lake Forest, CA 92630; (714) 770-7930.

*Circle 399 on reader card*

### **NISC Updates IView: Object Manager**

Network Imaging Systems Corp. (NISC) announced IView: Object Manager Release 1.6. This software brings the addition of HP-UX server support and new services for streamlining object capture. These services include template recognition services which provide support or optical character recognition and bar code recognition, transaction journaling for backup and restore functions and enhanced batch processing capabilities.

Database independent and compatible with Visual Basic, PowerBuilder, SQLWindows, C and C++, Version 1.6 runs on UNIX servers with Windows clients.

Contact NISC, 500 Huntmar Park Dr., Hemdon, VA 22070; (703) 478-2260.

*Circle 398 on reader card*

### **SCH Enhances REEL Manager**

Software Clearing House (SCH) announced that the REEL Manager family features vault management capabilities. The additional functionality of vault management allows customers to better manage their off-site storage locations by reporting slot assignment information and producing tape pick lists.

The REEL Manager suite includes REELibrarian, a tape library management system for networked UNIX environments; REELbackup, a backup product featuring local and remote tape device support; REELaccess, which provides UNIX connectivity with Storage Technology Corp. automated cartridge library systems; and REELexchange, which translates and converts IBM and ANSI tapes to and from UNIX systems.

This product family is available on UNIX platforms, including HP, IBM, Sun, Sequent, AT&T/NCR, SGI, Pyramid, Unisys, Data General, Hitachi, Encore, Convex, Motorola and DEC.

Contact SCH, Three Centennial Plaza, 895 Central Ave., Cincinnati, OH 45202; (513) 579-0455.

*Circle 397 on reader card*

### **Zyxomma Offers RTE-UX**

Zyxomma Software Consultants announced the availability of RTE-UX, a product for HP-UX that enables HP 1000 RTE-based applications to be easily migrated to HP 9000 systems.

RTE-UX provides a complete RTE environment in HP-UX. This includes a comprehensive emulation of most of the intrinsic of RTE, such as EXEC, FMP, the Class System, Resource Management and SHEMA, by means of native mode



HP-UX subroutine libraries. A small daemon manages the RTE class number and LU tables, but with little system overhead. RTE-UX also includes code conversion facilities for languages such as Fortran and for subsystems such as FORMS/1000.

Major subsystems such as IMAGE/1000 are fully supported with the IMAGE-UX product from Denkart. IMAGE-UX is a complete native mode IMAGE/1000 implementation for HP-UX.

Contact Zyxomma Software Consultants, 40 Littledown Dr., Bournemouth BH7 7AQ, United Kingdom; 44 1202 395453. [GET US ADDRESS]

*Circle 396 on reader card*

### MaxTech Announces DOUBLEVISION

MaxTech introduced DOUBLEVISION for X Window Systems, which lets users share X Windows applications across any TCP/IP network — including those that offer dial-up protocols for TCP/IP like PPP and SLIP. When a window is shared using DOUBLEVISION, all users see exactly the same window and share mouse and keyboard control. It also is hardware and software independent.

The menu-driven DOUBLEVISION for X Window Systems lets users share the applications, regardless of their display type, and works with X software or hardware to provide automatic color, resolution and font translation. It features full support for user conferencing and security to prevent unauthorized access.

The X Windows version of DOUBLEVISION is available for HP 9000/700s running HP-UX, IBM RS/6000s running AIX, Silicon Graphics workstations, DEC workstations running OSF/1 and Sun workstations running Solaris 2.x and SunOS 4.x.

Pricing starts at \$495 per two-user license.

Contact MaxTech, 100 Cobb Place Blvd. NW, Bldg. 200, Ste. 240, Kennesaw, GA 30144; (404) 428-5000.

*Circle 395 on reader card*

### Heroix Unveils RoboMon Investigator

Heroix Corp. introduced RoboMon Investigator, a new solution for managing resources and troubleshooting problems on multiple UNIX systems. Designed to give highly visual, interactive, simple and flexible control of a computer's resources, RoboMon Investigator allows system administrators and users to quickly scan

important information in order to take corrective action.

It is capable of collecting over 200 statistics directly from the UNIX system. The data is categorized into 7 domains: files, files summarized by users, files summarized by group, file systems, processes, users and networks. Problems which can be identified include: overly large files, new large files, storage allocation issues, file systems not mounted, file systems running out of space, CPU hogs, zombie processes, missing critical processes, inactive users, users without passwords and excessive network traffic.

RoboMon Investigator allows you to view information quickly and clearly through its Motif-based GUI, which lets you take immediate action by clicking on one or more selected resources, and then clicking again to initiate the appropriate corrective action. If the desired action is not built-in, users can add site-specific actions.

RoboMon Investigator is available on: HP-UX, AIX, OSF/1, SunOS and Solaris. Prices range from \$395 to \$1,995.

Contact Heroix Corp., 120 Wells Ave., Newton, MA 02159; (617) 527-6132.

*Circle 394 on reader card*

### Bridgeway Releases EventIX MapSync 2.0

Bridgeway Corp. announced MapSync version 2.0, which now supports SunSoft's SunNet Manager, as well as HP OpenView and IBM NetView for AIX. MapSync is a network management application that synchronizes object database and network topology mapping functions across dissimilar platforms under the SNMP management protocol.

With MapSync 2.0, SunNet Manager users cannot only share topology information among multiple SunNet Manager systems, but also have these systems interact and share map and event information with HP OpenView and IBM NetView for AIX systems. Manual changes from one map are incorporated together with filtering criteria so that transmitted maps can be customized and tailored to each operation environment. Changes made in object status or topology maps can be automatically and simultaneously sent to any of the above named managers. MapSync also can generate an audit trail on all operations performed.

Contact Bridgeway Corp., Jefferson Office Park, Ste. 300, 800 Turnpike St., N. Andover, MA 01845; (508) 683-3626.

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and spend a  
fortune on  
implementation  
and training.*



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## Unify Ships Release 2 Of Unify VISION

Unify Corp. shipped Release 2 of Unify VISION, a client-server application development tool for HP 9000/7xx, Sun SPARC and Windows platforms. It has second generation features, such as Scalable Rapid Application Development and Deployment (RADD) architecture, automated application partitioning and an object repository-based development environment.

A single user development license for Unify VISION Release 2 costs \$4,995. A "SmartPack" includes five development and 10 deployment licenses, and costs \$25,000.

Contact Unify Corp., 3901 Lennane Dr., Sacramento, CA 95834; (916) 928-6400.

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## GSI Transcomm Introduces UNIX Version Of TOLAS

TOLAS software provides a range of functions to support the complete process of getting a finished product from the manufacturing line to the customer, including sales and customer service,

product distribution, logistics and warehouse management, inventory and financial control.

It meets the needs of companies operating in multiple locations in the United States or internationally, with such system-wide capabilities as multisite warehousing, compliance to local and multinational tax regulations, management of warehousing at multiple locations, sales in different currencies and producing reports in many languages.

TOLAS for UNIX will work on the following UNIX computers: HP 9000 (HP-UX 9.0 or greater), DEC Alpha (OSF/1 1.3 or greater), IBM RS/6000 (AIX 2.3 or greater) and Data General AViiON (SVR 5.4.2 or greater).

Contact GSI Transcomm, 1380 Old Freeport Rd., Pittsburgh, PA 15238; (412) 963-6770.

Circle 391 on reader card

## Seer Technologies Enhances Seer\*HPS

Seer Technologies Inc. announced an enhanced version of Seer\*HPS and a new suite of integrated products addressing a full

range of client-server needs.

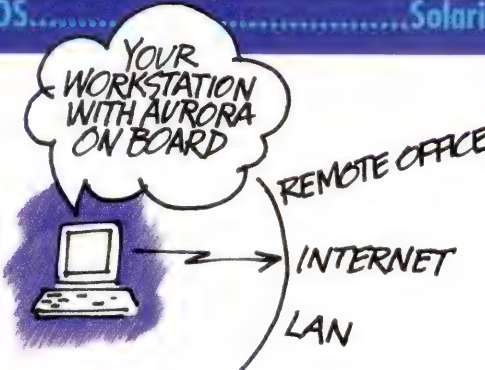
New products to Seer\*HPS include: NetEssential, Freeway, TurboCycler, Configuration Tools and Windows Flow Diagrammer.

Enhancements in Release 5.3 include: integrated multiplatform middleware for multitiered production environments; conference-based team development supporting distributed development teams; and rapid application design and construction for improved end use involvement and developer productivity.

Seer\*HPS supports the following distributed LAN server platforms for development: Microsoft's Windows NT and SQL Server; HP 9000 Series 800 servers running HP-UX, IBM's OS/2, RS/6000 and AS/400; AT&T's 3000 server family running UNIX SVR4 MP RAS or Windows NT; Sun SPARC running SunOS and Solaris; and Compaq's ProLiant family of Pentium uni- and multiprocessing servers running Windows NT.

Introductory pricing for server environments starts at \$75,000 and \$225,000 for mainframe client-server environments.

SunOS
Solaris/Intel
HP/UX



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Contact Seer Technologies, 8000 Regency Pkwy., Cary, NC 27511; (919) 380-5000.

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### **ObjectSpace Offers STL <Toolkit>**

ObjectSpace Inc. announced a new version of the Standard Template Library — the accepted ANSI/ISO standard for the C++ programming language — allowing developers access to the new standard.

ObjectSpace's STL <Toolkit> offers multithread extensions, including read and write locking, and is compatible with front-based compilers.

The STL <Toolkit> features: Thread-Kit, comprehensive tutorial and class catalog, hundreds of examples, rigorous test suite and fully commented source code.

It has been ported to the following UNIX compilers: HP, Sun V3 and V4, and Centerline V2.1. It also is ported to PC compilers such as Borland, Microsoft and Symantec.

The STL <Toolkit> will be bundled free with ObjectSpace's Object Systems, a complete C++ framework for professional cross-platform UNIX systems development. Independently, the product will cost \$149.

Contact ObjectSpace Inc., 14881 Quorum Dr., Ste. 400, Dallas, TX 75240; (214) 934-2496.

*Circle 389 on reader card*

### **Inclination Software Updates SpeedEdit/iX**

Inclination Software released version A.07 of SpeedEdit/iX, a full screen, language-sensitive text editor for MPE/iX systems. Also released is SpeedEdit/3000 version C.07, which supports Classic HP 3000 systems.

The major enhancement in the A.07 release is a text-oriented forms capability which allows users to quickly define forms that combine fixed fields with free form text editing capabilities. Applications range from questionnaires, deeds, purchase orders, invoices, E-mail and programming applications. Included are several form-oriented routines. One offering assists COBOL or C language programmers with templates which provide a means of tracking source code maintenance by automatically adding forms-oriented comments at the top of source files. The programmer is forced to form fields where they can enter their name and the intended modification before they commence editing. Other routines provide an E-mail front end, expense reporting form, online

software registration and online maintenance requests.

The A.07 release offers: increased reliability; better support for the COBOL, C, FORTRAN and PASCAL languages; a user customizable "tags" facility; and improved performance for displaying multiple files side by side on-screen.

Extensions also have been made to the SpeedEdit macro language, offering even greater flexibility in customizing the SpeedEdit package to changing user needs. Contact Inclination Software Inc., P.O. Box 8668, Incline Village, NV 89452; (702) 831-5595

*Circle 388 on reader card*

### **Panorama 2.0 Provides Limitless Workspace**

IXI introduced a new version of IXI Panorama workspace manager software, which now includes IXI Mosaic for accessing information on the Internet and IXI Launchpad for rapid application fire-up.

IXI Panorama lets users position windows over a virtual workspace — many times larger than their physical screens — than can be accessed instantly using a keystroke or mouse.

It is compatible with emerging CDE standards such as Motif 1.2 and can be used as part of IXI's new Eye2eye, advanced user environment for heterogeneous UNIX and PC environments. It is available on SunOS and Solaris, and will be ported to the following UNIX platforms: HP, DEC Alpha, IBM, SCO and SGI.

IXI Panorama is ideal for financial applications, as well as computer-aided design, helpdesk systems and software development. And for notebook or laptop users, it instantly overcomes the inherent small screen.

A single user license costs \$179.

Contact IXI Corp., 400 Encinal St., P.O. Box 1900, Santa Cruz, CA 95061; (408) 427-7700.

*Circle 387 on reader card*

### **ADP Releases CSS V6.0**

Automatic Data Processing Inc. (ADP) announced the Client Server Series (CSS) HRMS 6.0.

New features in CSS 6.0 include Autolink, a new proprietary connection providing seamless Windows-based integration with ADP's service payroll and other value-added services; a customized version of ReportSmith for querying and report-writing; an enhanced GUI; a new model for payroll data entry; additional HR

*To use Xerox  
production  
printers,  
electronic forms  
and highlight  
color, just buy  
a mainframe.*



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consolidations and departmental  
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SUPERDEX. PC download capability.

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criteria. DB/Access saves many  
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## new products

functionality; and new platform support for  
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CSS is composed of four comprehensive, fully-integrated software modules:  
CS Human Resources, CS Benefits  
Administration, CS Flexible Spending  
Accounts and CS Payroll.

Contact ADP Inc., One ADP Blvd.,  
Roseland, NJ 07068; (201) 994-5000.

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## SET, Atria Announce Product Integration

Software Emancipation Technology Inc.  
(SET), developer of ParaSET, a C/C++  
Development Information System (DIS),  
announced the availability of the ParaSET  
integration with Atria Software's ClearCase  
software configuration management (SCM)  
product. The integration will enable  
development teams to speed development  
on large-scale software projects, and to  
produce higher quality software faster and  
with greater predictability.

ParaSET's interface provides support for  
advanced ClearCase SCM features to  
preserve the consistency and validity of  
SET's software information model. It also  
provides ParaSET users with simplified  
access to critical ClearCase capabilities for  
improved parallel software development,  
including powerful branching and merging,  
and advanced developer workspace features.

The ParaSET interface to ClearCase is  
available on SunOS, Sun Solaris and HP-  
UX workstations.

Contact SET Inc., Kiln Brook V, 20  
Maguire Rd., Lexington, MA 02173; (617)  
863-8900.

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## Blast Inc. Introduces Blast For Windows

Blast Inc. released BLAST Professional for  
Windows v10.2, the newest addition to the  
Blast family of high-speed data commun-  
ications software. Blast's complete cross-  
platform product line allows fast reliable file  
transfer between a wide variety of operation  
systems and computers. Any computer  
running Blast can communicate with any  
other computer running BLAST, allowing  
businesses to seamlessly connect PCs,  
UNIX systems, minicomputers and main-  
frames.

Blast for Windows includes a unique  
point-and-click file transfer feature allowing  
users to transfer files with the click of a  
mouse button. It includes the following file  
transfer protocols: Xmodem, Ymodem,  
Zmodem and BLAST, as well as supporting  
popular terminal emulations.

Other Blast Professional products  
include: DOS, SCO UNIX, AT&T UNIX,  
Interactive UNIX, SCO XENIX, Data  
General AViiON (DG-UX), HP 9000  
(HP-UX), RS/6000, Solaris 1.x, 2.x and  
x86, Macintosh and DEC VMS.

Blast for Windows costs \$199. Upgrades  
from BLAST Professional for DOS cost  
\$60.

Contact Blast, P.O. Box 808, Pittsboro,  
NC 27312; (919) 542-3007.

Circle 383 on reader card

## GDT Softworks Ships PowerPrint/5P

GDT Softworks Inc. shipped its Power-  
Print/5P product, offering Macintosh  
connectivity for the HP LaserJet 5P printer.  
PowerPrint/5P is customized for the  
LaserJet 5P and will take full advantage of  
the printers features such as the built-in  
LocalTalk interface and TrueType fonts  
capability.

PowerPrint/5P includes Chooser-level  
printer driver software and a serial cable for  
direct connection. The driver software also  
is network capable if the printer is placed  
on a LocalTalk network via connectors  
such as Farallon's PhoneNets.

PowerPrint/5P provides Mac users with  
a complete range of software features  
including: built-in background printing  
capability; flexible scaling options; 32-bit  
greyscale support; and cover pages. It also  
supports the LaserJet 5P's 600 dpi  
resolution, multiple paper paths and  
resolution enhancements.

PowerPrint/5P's font downloading  
transfers scalable typefaces used in a  
document directly to the printer, instead of  
bitmapping the entire page as has been  
previously done to assure WYSIWYG  
compatibility.

The PowerPrint/5P costs \$69.

Contact GDT Softworks Inc., 4664  
Lougheed Hwy., Ste. 188, Burnaby, BC  
V5C 6B7; (604) 291-9121.

Circle 369 on reader card

## Bullseye Updates C-Cover Version 3.0

Bullseye Software announced C-Cover  
version 3.0, a branch coverage analyzer for  
C and C++. C-Cover increases testing  
productivity and saves time by identifying  
untested control structures, functions, C++  
classes, source files and subsystems. This  
tool measures true branch coverage, which  
is more thorough than the measurement  
performed by other coverage analyzers and  
by profilers. A new feature allows forcing  
execution flow through specified branches.



This allows testing error conditions which are otherwise too difficult to reproduce. C-Cover can analyze multithreaded code, dynamic link libraries, device drivers and system-level code. C-Cover is designed to analyze very large projects and includes a powerful capability for sorting, filtering and summarizing large amounts of coverage information. Under Windows NT, C-Cover takes advantage of the Win32 API to provide additional features. C++ is fully supported, including inline functions and exception handling. Run-time source and utility programs are included.

C-Cover is available for Windows, Windows NT, DOS, UNIX and OS/2, and it supports all popular compilers. Contact Bullseye Software, 5129 24th Ave. NE, Ste. 9, Seattle, WA 98105; (800) 278-4268.

*Circle 366 on reader card*

### **Sterling Software Offers ANSWER:Architect For Zim**

Sterling Software introduced ANSWER:Architect for Zim, a low-cost analysis, design and documentation tool that extends the capabilities of Sterling's 4GL/ADE ANSWER:Zim.

ANSWER:Architect for Zim provides the application architect or developer with a centralized repository to store and retrieve design information. Diagram, text, relationship and matrix editors are provided to manage this information, as well as OLE capabilities to alternate tools. A bidirectional metadata exchange facilitates automated E-R Diagram generation for Zim databases, as well as Oracle, Sybase, SQL Server and DB2 databases accessed by Zim. Impact analysis is achievable along with automated documentation generation. All information can be used by ANSWER:Architect to integrate and design business models.

ANSWER:Zim provides a 4GL that allows application developers to build complex business applications that are completely portable across platforms such as Windows, DOS, UNIX and VMS. With a logical programming design based on the Entity-Relationship data model, ANSWER:Zim offers the developer separation and independence of user interface, data storage, business logic and environment configuration. Development is not limited to user interface driven client-server solutions.

Contact Sterling Software, 36 Antares Dr., Ste. 500, Nepean, ON K2E 7W5; (613) 727-1397.

*Circle 368 on reader card*

### **GT Backup 4.4 Employs Motif**

Alida Inc. shipped Release 4.4 of GT Backup, its network-based backup, restore and tape management software which now supports HP-UX 9.0 and employs the Motif GUI.

Release 4.4 runs on HP 9000 Series 700/800 workstations and servers, as well as Sun Solaris 2.4 and IBM RS/6000 platforms. Alida also enhanced GT Backup's flexibility by including a Motif as well as a OpenLook GUI, plus a character-based user interface. Additionally, there is support for a wide range of robotic mass storage devices.

GT Backup features standard UNIX tape formats, which allow for independent recovery. The software simultaneously performs multiple backups and writes to multiple tape drives. With GT Backup, any computer on the network can back up to any device on the network, and should a portion of an automatic backup fail, it can be attempted again as part of another run.

GT Backup costs \$395 for a single user license.

Contact Alida Inc., 27 McDermott Place, Bergenfield, NJ 07621; (201) 384-0080.

*Circle 367 on reader card*

### **HARDWARE**

### **MicroTech Offers ImageMaker CD Duplicator**

MicroTech Conversion Systems announced ImageMaker Recordable CD Duplication System. Using five Kodak 6X recorders with transporters, the ImageMaker duplicates disks unattended and accomplishes the task as much as 50 percent faster than a four-speed system. The five-drive ImageMaker takes 12 minutes to duplicate a standard 74 minute disc, it does not require caddies and it can track material using bar coding.

ImageMaker keeps track of the number of good disks produced and reports quantity and time taken to complete each job. The duplicator copies CDs for Macintosh, UNIX, OS/2, DOS and propriety systems. It supports ISO 9660, Rock Ridge, HFS, UFS, CDR, CDI, CD-XA and CD Audio formats.

Prices start at \$48,000 for a Kodak system with one 6X drive and one 75-disk capacity transporter.

Contact MicroTech Conversion Systems, 940 Industrial Ave., Palo Alto, CA 94303; (415) 424-1174.

*Circle 382 on reader card*

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Or it's my neck.

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CIRCLE 165 ON READER CARD



## Sierra Wireless Ships PocketPlus 210 Modem

Sierra Wireless shipped the PocketPlus 210 for Windows. PocketPlus' embedded modem software fully accommodates all existing CDPD specifications and clean migration to future specs through software upgrades. It offers advanced features including power savings, channel hopping, cell hand-offs and roaming.

The PocketPlus features multiple data communications options including 19,200 bps CDPD, as well as 14,400 bps V.32bis and V.17 fax over circuit switched cellular and wireline Public Switched Telephone Network (PSTN). It includes a cellular transceiver and rechargeable batteries into a palm-sized, serially-connected modem for Windows-based portable computers. Its user interface software makes configuration, modem switching and channel monitoring simple.

Bundled with software that ensures easy installation and intuitive use, the PocketPlus for Windows supports WinSock 1.1, TCP/IP-based applications in all modes. Contact Sierra Wireless Inc., #260, 13151 Vanier Place, Richmond, BC V6V 2J2; (604) 231-1100.

*Circle 381 on reader card*

## Multi-Tech Introduces MT2834PCS/c Modem

Multi-Tech Systems Inc. announced an internal ISA bus version of its Simultaneous Voice and Data (SVD) mode, the MultiModemPCS, incorporating 28.8 Kbps V.34 technology. The new MT2834PCS/c is specially designed to address the needs of the desktop video conferencing market. The MT2834PCS/c features Multi-Tech's "Talk Anytime" capability for use with a standard telephone. A special software package (model MEPCS) for Multi-Tech SVD modems also is available, and includes: MultiExpressPCS answering machine software with the "Virtual Modem" driver, MultiExpress fax and data communications software and TALKShow document conferencing software from Future Labs.

The MT2834PCS/c SVD modem is priced at \$449. The MEPCS SVD software is priced at \$199.

Contact Multi-Tech Systems Inc., 2205 Woodale Dr., Mounds View, MN 55112; (612) 785-3500.

*Circle 380 on reader card*

## Canon Debuts BJC-70 Printer

Canon Computer Systems Inc. announced the BJC-70, which offers SOHO users

high-quality color printing anywhere, anytime. The BJC-70 provides users with color Bubble Jet printing with 720 dpi output for black text and 360 dpi for color. Also, the BJC-70 prints .8 ppm in color performance and 4 ppm speed for monochrome.

In addition, the BJC-70 is bundled with Color Advisor, Canon's proprietary software that offers tailored color palettes to allow users to select and add custom color to their

documents. The user can adjust these color combinations based on audience type, as well as document style, content and occasion. Canon also introduced the BJ-30, the monochrome counterpart to the BJC-70.

Price is \$399 for the BJC-70, and \$299 for the BJ-30.

Contact Canon Computer Systems Inc., 2995 Redhill Ave., Costa Mesa, CA 92626; (714) 438-3000.

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## BGL Technology Corp. Adds Two Printer/Plotters

BGL Technology Corp. announced the LaserLeader Mark 9516 and LaserLeader Mark 9508. The 16 ppm 9516 and the 8 ppm 9508 are 11- x 17-inch, multihost laser printer/plotters and are designed to meet the specific needs of CAD/CAM, multinetwork and multi-operating system environments.

The 9516 rated at 30,000 pages per month and the 9508 at 20,000 pages both print at true 600 x 600 dpi, or at 1200 x 600 dpi with BGL's HighResPac option.

Both have multimedia trays which support envelopes, vellum, labels, transparencies and heavier stock paper.

Both LaserLeader's non-network interfacing selections include Centronics, Versatec and Dataproducts parallel and dual RS-232 ports. Direct connect network choices include: LocalTalk; Ethernet — DECnet, TCP/IP, Novell, EtherTalk and several PC LANs; and Token Ring — TCP/IP, Novell and TokenTalk. The printer support up to five interfaces simultaneously, spool incoming jobs on their internal 270 MB hard disk drive and

automatically detect and switch to the proper emulation.

Standard emulations include BGL/PDL (PostScript), CCITT Group IV TIFF/CALLS, HP PCL, HP 2000, HPGL (7475 7550, 7580, 7585), HPGL/2, CalComp 906/907, Tektronix 4010/4014, Versatec V-80, LN03 Plus, Line Printer, QMS Magnum Code V, CADAM and Unisys operating environments.

The 9516 costs \$4,495 (\$4,995 for the Pentium model) and the 9508 costs \$3,675 (\$4,295 for the Pentium model).

Contact BGL, 451 Constitution Ave., Camarillo, CA 93012; (805) 987-7305.

Circle 377 on reader card

## Dataproducts Announces Typhoon 8 Printer

Dataproducts Corp. announced the Typhoon 8, a RISC-based 8 ppm network laser printer with 1200 dpi resolution, full-bleed 11- x 17-inch imaging, Adobe PostScript Level 2, PCL5+ and 7475A emulations, 36 MB memory and a PostScript fax/modem option for camera-ready document faxing.

Rated at 20,000 pages per month, the Typhoon 8 provides lithographic quality output using 1200 x 1200 dpi print resolution. DpTek's TrueRes technology is incorporated to improve curves and smooth jagged edges. The printer also uses Data-product's new 7-micron toner system which further enhances print quality by providing cleaner edges, better graphics and reduced toner scatter.

Typhoon 8's optional PostScript and CCITT Group 3 fax/modem can send and receive documents in camera-ready high-resolution. Fast throughput is achieved by using a 25 MHz IDT 3081 RISC-based high-speed controller and a job overlap feature that allows printing of one job while processing another in the background.

Typhoon 8's standard connectivity supports RS-232-C/RS-422 serial, LocalTalk, and bi- or unidirectional parallel connections.

The Typhoon 8 printer is available in three base models: a 600 dpi, 4 MB version for \$3,199; a 600 dpi, 4 MB version with Ethernet for \$3,699; and a 1200 dpi, 36 MB version for \$5,199.

Contact Dataproducts, 6219 DeSoto Ave.,

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LAN Magazine 1994

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Woodland Hills, CA 91367; (800) 980-0374.

*Circle 378 on reader card*

## Maxpeed Corp. Unveils MaxRack

Maxpeed Corp. announced the MaxRack I/O bus expansion subsystem for all Maxpeed controllers, greatly extending the number of MaxStation multiconsole terminals and intelligent multiport adapters that may be attached to a single PC or server. Requiring no software, each MaxRack provides an attractive expansion cabinet for up to 7 additional controllers, but only uses one ISA slot in the host system for its own adapter. Because four MaxRacks may be attached to a single PC, this provides a low-cost solution for user to expand every PC or server.

Under SCO UNIX, 52 SuperVGA MaxStations is the upper limit, while for VGA, 104 stations is the limit when using the new SVX controllers, which allows 32 multiconsole stations on a single host. For the SS series of intelligent multiport adapters, any combination of controllers is valid up to a total of 128 ports, in addition

to the serial and parallel ports that are standard on any MaxStation in the system.

MaxRack is priced at \$495 for the ISA bus version.

Contact Maxpeed Corp., 1120 Chess Dr., Foster City, CA 94404; (415) 345-5447.

*Circle 376 on reader card*

## ODS Provides EtherStack Hubs

Optical Data Systems Inc. (ODS) announced a new line of EtherStack stackable hubs — the ODS EtherStack 1105-16ESU and SNMP manager EtherStack 1105-16ESM. The EtherStack series will provide managed and unmanaged hubs. The managed hub comes with an ODS hub management tool that runs on HP OpenView for Windows workstations and provides an SNMP agent with RMON support and MIB II extensions. The hub manager provides facilities for single-point configuration, control/updating of software and displays real-time status information.

The EtherStack hubs improve the network availability by automatically recovering from most network failures.

The EtherStack 1105-16ESM and

EtherStack 1105-16ESU are priced at \$2,240 and \$1,490, respectively.

Contact ODS, 1101 Arapaho Rd., Richardson, TX 75081; (214) 234-6400.

*Circle 374 on reader card*

## Applied Concepts Inc. Produces SCSI Switch

Applied Concepts added six rack mountable versions of its SCSI Switch to its product line. Models are available for single-ended, differential, narrow (8-bit) and wide (16-bit) SCSI versions and provide electronic switching of six independent SCSI ports in any combination. The SCSI Switch is a 4 X 2 Electronic Crosspoint switch which offers fully transparent selection of up to 32 SCSI devices between two separate computer systems.

The SCSI Switch can be controlled locally, from the front panel or via the remote RS-232 interface. Software for Windows and Macintosh GUI operation are included for easy installation and operation of the SCSI Switch.

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To introduce the new 9000 Series of Floppies, Hard Disks and Tape Storage Products for HP-UX Systems, Texas ISA is offering a special introductory pricing on their new **high performance 2 GB** subsystem. It's **fast** with an average seek time of **9.5 ms**. More importantly, it's extremely **reliable** with an MTBF of 800,000 hours. That's why it's backed with a **five-year warranty**. But best of all, its compatibility with your HP 9000 Series 700/800 systems is **guaranteed!** Contact Texas ISA at (800) 361-2258, or (713) 493-9925.

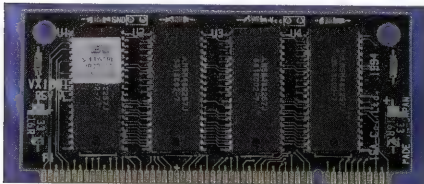
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### INTRODUCTORY PRICING FOR HP712 MEMORY BOARDS

ISA introduces their newly released memory cards for the HP712 with a special introductory pricing. Call for their 32 MB and 64 MB guaranteed best prices, with lifetime warranty. Call (800) 361-2258 or (713) 493-9925.

Circle 401 On Reader Card



### AUTOMATIC UNIX STARTUP/SHUTDOWN DEVICE PROVIDES SECURITY, SAVINGS AND CONVENIENCE

Texas ISA, Inc. announced the availability of its new Model 7030 with an Ethernet interface to allow the operation and control of networked UNIX system(s), with a single flick of a switch. The system power ON/OFF process can also be automated by the built-in timer, UPS Power Fail Signal, a shutdown request from the RS-232 or modem ports, and also by environmental triggers such as temperature and humidity. Additionally, alarms or preset messages can be sent to a pager. A Model 7020 (with no Ethernet interface) is also available. Prices for the Models 7020 and 7030 range from just under \$1,000 to \$2,500. Contact Texas ISA at (800) 361-2258, or (713) 493-9925.

Circle 402 On Reader Card



### NEW TOTOKU HIGH RESOLUTION, FULL-FEATURED COLOR MONITORS

If you are looking for a high-quality 17- or 21-inch color monitor, check out the new Totoku line of enticingly priced monitors from Texas ISA. Totoku has been an OEM for Sony and other vendors, and now introduces their very own models, the CV172U (17-inch priced at \$1,190) and CV211U (21-inch priced at



\$2,125). Texas ISA can be contacted at (800) 361-2258, or (713) 493-9925.

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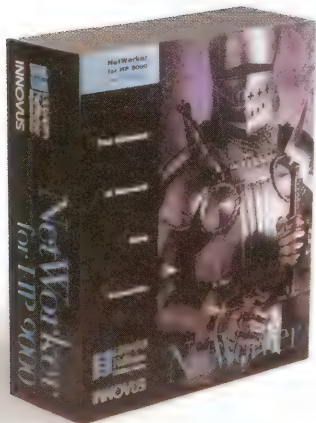
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NetWorker's legendary protection. Available for HP-UX from Innovus.

For more information on NetWorker for HP 9000, contact an authorized reseller, or INNOVUS at:

(905) 529-8117, Fax: (905) 572-9586,

or E-Mail:

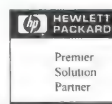
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CIRCLE 167 ON READER CARD



# Reader Information

## **ANDATACO CIRCLE 386**

ANDATACO is a leading designer and manufacturer of enterprise-wide storage technologies, and a leading system and network integrator for the UNIX client-server market. ANDATACO offers a complete line of disk, tape, fault-tolerant RAID and redundant tape array storage products. ANDATACO's World Wide Web home page, On-The-Net (URL—<http://www.andataco.com>) provides technical, product, pricing and ordering information interactively through the Internet.

## **ARTECON INC. CIRCLE 242**

Artecon is a leading systems integrator and manufacturer of value-added hardware and software products for the UNIX marketplace. Product lines include Opticals, Removables, Backups, Storage and Accessories. Call (800) USA-ARTE, FAX (619) 931-5527.

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Contact Applied Concepts Inc., 9130 SW Pioneer Ct., Wilsonville, OR 97070; (503) 685-9300.

*Circle 375 on reader card*

## Kelly FlashSIMM Expands Electronic Forms Printing

Kelly Computer Systems announced Kelly FlashSIMM, a 1 MB internal flash memory for use with HP LaserJet Series 4 printers.

With FlashSIMM, 1 MB of of electronic forms, fonts, signatures, checks, letterhead, graphics, bar codes and other frequently printed materials can be sorted in a non-volatile flash memory of an HP LaserJet 4 Series printer.

Also, with Kelly FlashSIMM's flash memory technology, form programming is never lost during power outages or when printers are accidentally turned off.

The Kelly FlashSIMM includes Windows-based form and font management software. Additionally, it works with most Windows programs that support PCL5 and above. If a LaserJet is connected on a LAN or WAN, programming of the Kelly FlashSIMM can be performed remotely. It also incorporates a password protection feature allowing companies to preserve important forms and documents while avoiding unintentional deletion. It is compatible with HP LaserJet 4, 4M, 4MP, 4Plus, 4MPlus, 4Si, 4SiMX, 4V and 4MB printers.

Cost is \$398.

Contact Kelly Computer Systems, 139 N. Whisman Rd., Mountain View, CA 94043; (415) 960-1010.

*Circle 365 on reader card*

## AER Energy Develops OmniBook 600 Battery

AER Energy Resources Inc. announced a long run-time battery for the HP OmniBook 600 notebook PC. The battery

will be offered as an optional third-party accessory for the OmniBook PC. Depending on a user's work pattern, the optional battery can power an OmniBook PC for 10 to 15 hours without recharging.

AER Energy zinc-air batteries are being designed to provide users of portable computers with full working day operation between recharges. Zinc-air technology has two to three times the energy density by weight of nickel-metal hydride (NiMH) batteries currently used in portable computers, and 1.5 times the energy density of weight of the lithium-ion (Li Ion) batteries currently used in portable computers.

Contact AER Energy Resources Inc., 1500 Wilson Way, Ste., 250, Atlanta, GA 30082; (404) 433-2127.

*Circle 364 on reader card*

## Box Hill Offers Four RAID Options

Box Hill Systems Corp. announced four RAID options: RAID Box 5300, hardware RAID optimized for maximum redundancy; RAID Box 5100, hardware RAID optimized for fast performance database operations (Sybase, Oracle); Box Hill RAID SW, software RAID for Solaris 2.x, optimized for volume management, redundancy and performance; and Box Hill RAID PC, hardware RAID for Novell and Windows NT servers, optimized for performance and simplified management.

"Hot spare" drives automatically take over from a failed disk, thus closing the safety gap between a drive's failure and its replacement (when a system without a hot-spare drive can not afford a second drive failure).

All three of the UNIX-platform RAID products support wide (20 MBps) or narrow (10 MBps) SCSI connections. Both RAID Boxes feature hot-swapping, redundant power supplies.

Contact Box Hill Systems Corp., 161 Ave. of the Americas, New York, NY 10013; (212) 989-4455.

*Circle 363 on reader card*

## AHA-1540CP Combines SCSI With PnP

Adaptec released a new addition to its AHA-1540 host adapter series — the AHA-1540CP — a SCSI host adapter with bus mastering that is fully plug-and-play- (PnP) compliant. The AHA-1540CP adapter provides a bus mastering architecture for optimal multitasking performance, plus PnP functionality for easy installation.

The AHA-1540CP host adapter meets



all requirements for the ISA bus and SCSI bus PnP specifications. Under the SCSI PnP protocol, the AHA-1540CP adapter automatically locates all connected SCSI devices and resolves SCSI resource conflicts in seconds. SCSI PnP manages these issues during the boot-up cycle by assigning IDs and determining termination requirements without user intervention.

ISA PnP manages installation of the host adapter itself into the ISA bus. ISA PnP automatically assigns resources such as interrupt request line, DMA channel and port address.

The AHA-1540CP is priced at \$269. Contact Adaptec, 691 S. Milpitas Blvd., Milpitas, CA 95035; (408) 945-8600.

Circle 362 on reader card

### Telebyte Releases High-Speed PC Modem

Telebyte Technology introduces the Model 207 PC Link to allow data transmission at 115.2 Kbps over distances of 3,500 feet.

The Model 207 PC Link is a high-speed PC modem that provides full duplex transmission from DC to 115.2 Kbps over two twisted pairs. This capability provides a communications link for remotely located PCs that wish to be attached to a LAN. This is accomplished by installing a terminal server on the LAN and using Model 207s to extend the high-speed data lines to the remote PCs. At reduced data rates, the distance can go to five miles.

The Model 207 does not require any power source, because it steals its operating power from the Transmit Data signal applied to its RS-232 connector.

The Model 207 is offered with a male RS-232 connector. The four-wire line interface is a four position terminal block and an RJ-11 modular phone connector. It includes built-in surge protection which uses pin 1, Frame Ground, as the path for suppressing surges. Price is \$99.

Contact Telebyte Technology Inc., 270 Pulaski Rd., Greenlawn, NY 11740; (516) 835-3298.

Circle 361 on reader card

### HP Printers Support Wireless Communications

HP introduced printers that offer support for wireless communications. Equipped with built-in infrared (IR) technology, the new printers allow users of IR-compatible computing devices to print files without first having to establish a physical connection between printer and device.

The LaserJet 5P and 5MP printers come with industry-standard SIMM slots. These

slots can be used for additional memory, other printer languages or customizing options. The printers are upgradeable to a total of 50 MB and 35 MB, respectively.

Both printers are designed with two IEEE 1284-compliant parallel ports. Each printer also has one LocalTalk port, the IrDA-compliant infrared port and automatic interface switching among all ports.

The high-speed, bidirectional parallel ports of the HP LaserJet 5P and 5MP

printers also allow for direct network integration when used with HP's JetDirect EX external print servers (Ethernet or Token Ring). These servers support multiprotocol stacks and over 13 network operation systems, such as Novell NetWare, IBM LANServer, Microsoft LAN Manager, Windows NT and Windows for Workgroups, UNIX and EtherTalk.

The HP LaserJet 5P printer costs \$1,109. The HP LaserJet 5MP costs \$1,299.

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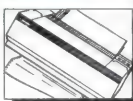
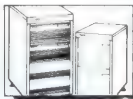
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## Nothing But Net For HP Customers



**By Ross  
Duncan**

What's the difference between Amway and HP? One sells cleaners, the other computers. Scouring power versus processing power. But as columnist Gordon McLachlan pointed out in his March 1995 column, there are similarities. And, they go beyond his story of HP sales reps moonlighting for Amway. Both companies rely on distributors to expand their markets. But the differences between selling soap and systems show why many HP customers will rely on distributors over the next few years.

HP wants its customers, especially midsize and smaller, to shop in the distributor channels. That's why we operate Integration Alliance, one of two companies HP selected to service and expand its customer base in the HP 3000 market. HP has determined that the best way to capture all the demand for its products is to have more outlets in the computer shopping mall. We can be in more places with more resources than factory-direct sales support. Distributors like ourselves now do HP's work: specifying, configuring, quoting and shipping systems, explaining technology, arranging financing and watching the future.

Distributors like Integration Alliance have become the first line of support for resellers in the HP channel. We insulate our Distributor Authorized Resellers (DARs), giving people who add value some needed protection from technical specifications and the movements of large corporations. In basketball, we'd be running interference while our partners handle the ball with customers. Distributors make it their business to understand how HP products fit.

We built that understanding through tradition and history, and years of play in the HP market. And we didn't get this status by reading a configuration book and taking "a cheesy little test." HP distributors must show experience building relationships with HP's strategy makers, as well as instill trust in the channel partners who implement that strategy.

There's 53 years of that HP experience at Integration Alliance — experience that allows our experts to provide well-considered, meaningful advice. We store that strength in our Configuration and Profitability System, an online tool DARs use to deliver accurate quotes. If we can't advise and counsel resellers better than they'd teach themselves, HP won't let us on the court.

So, our game plan is running a fast break. We've signed on to serve software providers who offer tools, utilities, databases, interconnectivity, development, deployment and complementary applications. These solution providers don't get a commission from HP. We give them a way to profit when their solutions bring HP 3000s and HP 9000s into customer sites. For the end user, this means buying systems from our solution providers is easier and faster than ever. HP even installs and supports the systems our DARs sell.

Customers don't get passed around from level to level. Instead, there's always an extra, open player to take the pass and head to the hoop.

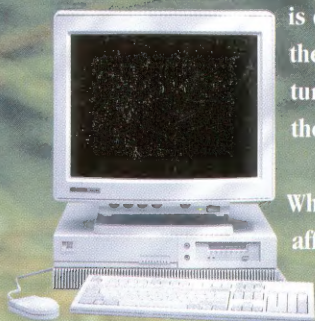
Teamwork means letting everyone contribute according to their special abilities. That's another benefit of HP's distributor channel. Specialists who might not ever receive HP's direct attention get to play. We serve this kind of DAR.

Information on HP products has value, but HP customers won't ever have to pay for it as Amway distributors do. That is the value that distinguishes HP's select distributors from Amway's army: information served to support the buyers, not sold as a revenue stream. Gordon was right about the similarity in one important way. Both Amway and HP distributors have the same goal — we want our customers to clean up when they buy from us. — *Ross Duncan is founder, senior vice president and CEO at Integration Alliance Corp. (Englewood, Colo.).*



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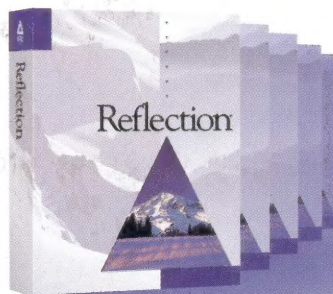
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